Issued June 1968

SOIL SURVEY

Cleveland County, Arkansas

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
ARKANSAS AGRICULTURAL EXPERIMENT STATION

Major fieldwork for this soil survey was done in the period 1960–63. Soil names and descriptions were approved in 1965. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1965. This survey was made cooperatively by the Soil Conservation Service and the Arkansas Agricultural Experiment Station; it is part of the technical assistance furnished to the L'Aigle Creek and the West Saline Soil and Water Conservation Districts.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms, ranches, and woodlands; in selecting sites for roads, ponds, buildings, or other structures; and in appraising the value of tracts of land for agriculture, industry, or recreation.

Locating Soils

The soils of Cleveland County are shown on the detailed map at the back of this survey. This map consists of many sheets that were made from aerial photographs. Each sheet is numbered to correspond with numbers shown on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbol. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information in this survey. This guide lists the soils of the county in alphabetic order by map symbol. It shows the page where each kind of soil is described and also the page for the capability unit, woodland group, and wildlife group in which the soil has been placed.

Individual colored maps showing the relative suitability or limitations of soils for many specific purposes can be developed by using the soil map and information in the text. Interpretations not included in the text can be developed by grouping the soils according to their suitability or limitations for a particular use. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about the soils in the sections "Descriptions of the Soils" and "Use and Management of the Soils."

Foresters and others can refer to the section "Use of the Soils for Woodland," where the soils in the county are grouped according to their suitability for trees.

Engineers and builders will find under "Engineering Uses of the Soils" tables that show characteristics of the soils that affect engineering practices and structures.

Game managers, sportsmen, and others concerned with wildlife will find information about soils and wildlife in the section "Wildlife."

Scientists and others can read about how the soils were formed and how they are classified in the section "Genesis, Morphology, and Classification of the Soils."

Students, teachers, and others will find information about soils and their management in various parts of this survey.

Newcomers in Cleveland County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "Additional Facts about the County."

Cover picture: **First pine plantation in Cleveland County. This plantation is on Savannah very fine sandy loam and is 13 years old.**

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NOTICE TO LIBRARIANS

Series year and series number are no longer shown on soil surveys. See explanation on the next page.

Issued June 1968

EXPLANATION

Series Year and Series Number

Series year and number were dropped from all soil surveys sent to the printer after December 31, 1965. Many surveys, however, were then at such advanced stage of printing that it was not feasible to remove series year and number. Consequently, the last issues bearing series year and number will be as follows:

Series 1957, No. 23, Las Vegas and Eldorado Valleys Area, Nev.
Series 1958, No. 34, Grand Traverse County, Mich.
Series 1959, No. 42, Judith Basin Area, Mont.
Series 1960, No. 31, Elbert County, Colo. (Eastern Part)
Series 1961, No. 42, Camden County, N.J.
Series 1962, No. 13, Chicot County, Ark.
Series 1963, No. 1, Tippah County, Miss.

Series numbers will be consecutive in each series year, up to and including the numbers shown in the foregoing list. The soil survey for Tippah County, Miss., will be the last to have a series year and series number.

SOIL SURVEY OF CLEVELAND COUNTY, ARKANSAS

BY FRED C. LARANCE, JAMES E. JAY, WILLIAM R. ELDER, JIMMY L. DANIELS, AND GEORGE E. BARNUM, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE ARKANSAS AGRICULTURAL EXPERIMENT STATION

CLEVELAND COUNTY is in the southeastern part of Arkansas (fig. 1). It covers an area of 384,640 acres, or 601 square miles. Rison is the county seat.

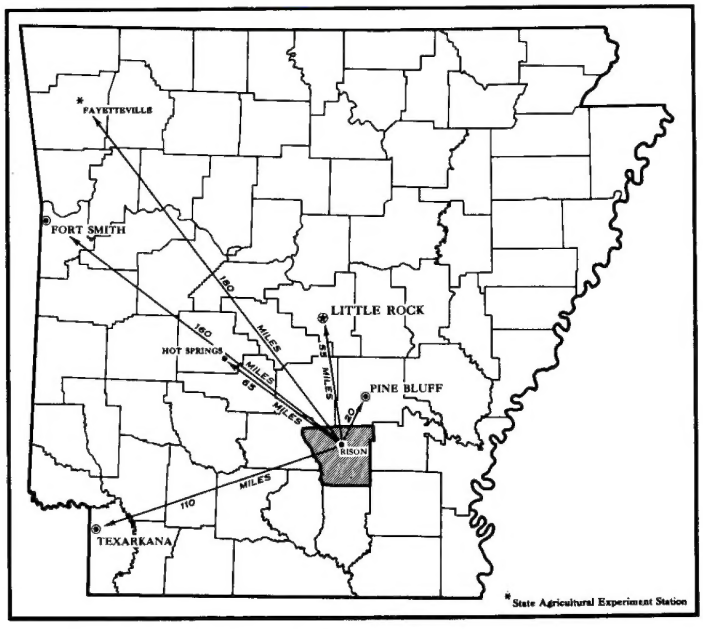

Figure 1.—Location of Cleveland County in Arkansas.

The greater part of this county is wooded, and the chief industries are centered around timber production. Most of the farmers work in the woods or in lumber mills and farm part time.

How This Soil Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Cleveland County, where they are located, and how they can be used. They went into the county knowing they likely would find many soils they had already seen, and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug or bored many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the underlying material that has not been changed much by leaching or by roots of plants.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. To use this survey efficiently, it is necessary to know the kinds of groupings most used in local soil classification.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, the major horizons of all the soils of one series are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Ruston and Susquehanna, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the natural, undisturbed landscape. Soils of one series can differ somewhat in the texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man.

Many soil series contain soils that differ in the texture of their surface layer. According to such differences in texture, separations called soil types are made. Within a series, all the soils having a surface layer of the same texture belong to one soil type. Susquehanna silty clay and Susquehanna very fine sandy loam are two soil types in the Susquehanna series. The difference in texture of their surface layers is apparent from their names.

Some soil types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use, that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into phases. The name of a soil phase indicates a feature that affects management. For example, Caddo silt loam, 0 to 1 percent slopes, is one of two phases of Caddo silt loam, a soil type that has a slope range of 0 to 3 percent.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the bound-

aries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this survey was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil type or soil phase.

Some mapping units are made up of soils of more than one series or of different types and phases within the same series. One such mapping unit is the undifferentiated group, which consists of two or more soils that occur together without regularity in pattern or relative proportion. The individual tracts of the component soils could be shown separately on the map, but the differences between the soils are so slight that the separation is not important for the objectives of the soil survey. An example is Wehadkee soils and Local alluvium.

Another kind of mapping unit is the soil association. It is a large acreage that consists of two or more soils and is uniform in pattern and proportion of these dominant soils, though these soils may differ greatly. An example is Ochlockonee-Wehadkee association.

Most surveys include areas where the soil material is so rocky or gravelly, so shallow, or so frequently worked by wind and water that it scarcely can be called soil. These areas are shown on the map like other mapping units, but they are given descriptive names, such as Gravel pits, and are called land types rather than soils.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soils in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soils. Yields under defined management are estimated for all the soils.

Only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in a way that it is readily useful to different groups of readers, among them farmers, ranchers, managers of woodland, engineers, and homeowners. Grouping soils that are similar in suitability for each specified use is the method of organization commonly used in the soil surveys. The soil scientists set up trial groups based on the yield and practice tables and other data. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others; then they adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Cleveland County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of farming or other land use. Such a map is not suitable for planning the management of a farm or field, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect management.

Described in the following pages are the seven soil associations in Cleveland County.

1. Wehadkee-Falaya association

Nearly level, poorly drained and somewhat poorly drained soils on bottom lands

This soil association is on the bottom lands of Moro Creek and Eagle Creek and south of Saline. It makes up about 6 percent of this county. Most of it is covered with hardwoods.

Wehadkee soils make up about 85 percent of this association, Falaya soils 10 percent, and scattered spots of Collins and Ochlockonee soils 5 percent.

Wehadkee soils are poorly drained. They have a surface layer of gray to light brownish-gray silt loam mottled with brown and a subsoil of gray silt loam to silty clay loam mottled with shades of gray, brown, and yellowish brown. Falaya soils are somewhat poorly drained. They are similar to Wehadkee soils in texture but have a thicker, dark yellowish-brown to grayish-brown surface layer.

About 99 percent of this association is wooded. A few small areas are used for summer pasture.

2. Wehadkee-Ochlockonee-Collins association

Nearly level, poorly drained to well-drained, frequently flooded soils on bottom lands

This soil association occupies frequently flooded bottom lands along the Saline River, Big Creek, Hudgin Creek, and the tributaries of these streams. It makes up about 15 percent of the county. Most of it is covered with bottom-land hardwoods.

Wehadkee soils make up about 50 percent of this association, Ochlockonee soils 30 percent, Collins soils 15 percent, and scattered Caddo and Falaya soils 5 percent.

Wehadkee soils are poorly drained. They have a surface layer of gray to light brownish-gray silt loam mottled with brown and a subsoil of gray silt loam to silty clay loam mottled with shades of gray, brown, and yellowish brown. They occupy the more poorly drained parts of the bottom land. Ochlockonee soils are the best drained members of this association. They gener-

ally are on natural levees bordering the streams. They have a surface layer of dark-brown to strong-brown very fine sandy loam and a subsoil of strong-brown to yellowish-brown silty clay loam to fine sandy loam. Collins soils are moderately well drained. They are similar to Wehadkee soils in texture but have a dark-brown to brown surface layer and upper subsoil.

About 98 percent of this association is wooded. Small tracts of Ochlockonee and Collins soils that are not frequently flooded are used for corn and small grain. Small areas of the other soils are used for pasture, mostly pasture consisting of such grasses as carpetgrass, dallisgrass, and bermudagrass.

3. *Savannah-Ruston-Saffell association*

Nearly level to moderately steep soils on upland ridges and side slopes

This soil association is on ridges that extend north and south. It is mostly in the southern part of the county, but one large area is in the northern half. This association makes up about 25 percent of the county. The slope range is 1 to 20 percent.

About 34 percent of this association is Savannah soils, 5 percent is Ruston soils, 10 percent is Saffell soils, and 51 percent is Boswell, Tippah, Shubuta, Bowie, Susquehanna, and Caddo soils. For the most part, the surface layer of these soils is fine sandy loam.

Ruston and Saffell soils are on the highest parts of the ridges, and Savannah soils are on the low parts. Ruston and Saffell soils are well drained and have a subsoil of strong-brown to red sandy loam to sandy clay loam. Saffell soils have a large amount of chert and quartz gravel in the surface soil and subsoil. Savannah soils are moderately well drained. They have a subsoil of yellowish-brown sandy clay loam to loam and a compact layer, or fragipan, at a depth of 18 to 36 inches.

Most of the cropland of the county is in this association. The principal crops are cotton, corn, tomatoes, small grain, potatoes, watermelons, and lespedeza. Ruston soils are well suited to tomatoes and other early crops. The chief pasture plants are dallisgrass, bermudagrass, carpetgrass, bahiagrass, white clover, and lespedeza.

Areas of the Saffell soils have been strip mined for gravel, which is used as construction material and as surfacing for secondary roads.

4. *Caddo-Prentiss-Stough association*

Level to gently sloping, poorly drained to moderately well drained soils on uplands and stream terraces

This soil association is on broad upland flats and long, narrow ridges of stream terraces. It makes up about 10 percent of the county and has a mixed cover of pines and hardwoods.

Caddo soils make up about 85 percent of this association, Prentiss and Stough soils 10 percent, and Cahaba, Angie, and Lafe soils 5 percent.

Caddo soils are poorly drained, are mottled with shades of gray and brown, and have a subsoil of silt loam to silty clay loam. Prentiss and Stough soils are on nearly level to gently sloping stream terraces. Prentiss soils are moderately well drained and have a subsoil of yellowish-brown silt loam to sandy clay loam. Stough soils are somewhat poorly drained. They have a subsoil of light yellowish-brown silt loam to silty clay loam mottled with gray and brown. Both Prentiss and Stough soils have a compact layer, or fragipan, at a depth of 12 to 36 inches.

More than 95 percent of this association is wooded. Small areas of Cahaba and Prentiss soils are used for row crops and pasture. Crops suitable for all except Lafe soils are cotton, corn, tomatoes, peas, and lespedeza. Lafe soils are not suited to crops.

5. *Tippah-Pheba-Boswell association*

Nearly level to moderately steep, moderately well drained and somewhat poorly drained soils that have a loamy or clayey subsoil; on uplands

This soil association is on ridges that extend north and south. It is mainly in the northern part of the county and makes up about 39 percent of the total acreage. A large part has a mixed cover of pines and hardwoods.

Tippah soils make up about 21 percent of this association, Pheba soils 15 percent, Boswell soils 12 percent, and Savannah, Ruston, Shubuta, Weston, and Caddo soils 52 percent.

Tippah soils have a thin surface layer of silt loam over a subsoil of yellow to strong-brown silt loam to silty clay loam mottled with red and gray. Boswell soils have a surface layer of loam and a subsoil of red to yellowish-red clay over mottled clay. Pheba soils are not so well drained as the other soils in the association. They have a surface layer of very fine sandy loam and a subsoil of mottled brown to yellowish-brown sandy clay loam to silt loam. A compact layer, or fragipan, occurs at a depth of 18 to 36 inches.

About 90 percent of this association is wooded. The principal crops are cotton, corn, small grain, and legumes. The common pasture plants are dallisgrass, bermudagrass, carpetgrass, bahiagrass, white clover, and lespedeza.

6. *Nacogdoches-Shubuta-Susquehanna association*

Nearly level to moderately steep, well-drained to somewhat poorly drained soils that have a loamy or clayey subsoil; on uplands

This soil association occurs in Redland Township, just north of the town of New Edinburg. It makes up about 3 percent of the county. Most of it is cultivated.

Nacogdoches soils make up about 30 percent of this association, Shubuta soils 30 percent, Susquehanna soils 30 percent, and Boswell soils 10 percent.

Nacogdoches soils are well drained. They have a reddish gravelly loam surface layer over a reddish gravelly clay loam to clay subsoil. Shubuta soils are moderately well drained. They have a surface layer of grayish-brown to brown fine sandy loam that is gravelly in places. The subsoil is red to yellowish-red sandy clay to clay. The underlying material is mottled sandy clay loam. Susquehanna soils are somewhat poorly

drained. They have a medium-textured to fine-textured surface layer and a subsoil of mottled red and gray clay.

About 80 percent of this association is in cultivated crops and pasture. The principal crops are cotton, corn, tomatoes, other vegetables, and small grain. The common pasture plants are dallisgrass, bermudagrass, carpetgrass, bahiagrass, white clover, and lespedeza.

7. *Caddo-Falkner-Hatchie association*

Level and nearly level, poorly drained and somewhat poorly drained soils formed in loess

This association is mainly at the northeastern edge of the county. It makes up about 2 percent of the acreage and has a cover of mixed hardwoods and a few scattered loblolly pines. The slope range is 0 to 3 percent.

About 71 percent of this association is Caddo soils, 21 percent is Falkner soils, 6 percent is Hatchie soils, and 2 percent is Savannah, Ruston, and Boswell soils.

The dominant soils in this association have a surface layer of silt loam and a subsoil of silt loam to silty clay loam mottled with shades of gray and brown. Falkner and Hatchie soils have a surface layer of loess a few inches to 30 inches thick.

More than 95 percent of this association is wooded. A small acreage of Falkner soils is used for cotton, corn, small grain, peas, and lespedeza. Ruston and Savannah soils, which are better drained than the other soils, are suitable for all row crops commonly grown in the county. The common pasture plants are dallisgrass, bermudagrass, carpetgrass, bahiagrass, white clover, and lespedeza.

Descriptions of the Soils

This section describes the soil series and mapping units of Cleveland County and gives a profile typical of each series. Following the description of each series, each mapping unit in the series is discussed, and any differences from the typical profile are pointed out. More detailed information about the series can be found in the section "Genesis, Morphology, and Classification of the Soils." Many of the terms commonly used in describing the soils are defined in the Glossary.

Following the name of each mapping unit is the symbol that identifies the soil or land type on the detailed map at the back of the survey. Shown at the end of each description are the capability unit, woodland group, and wildlife group in which the mapping unit has been placed. The page on which each mapping unit and each group is described is listed in the "Guide to Mapping Units" near the back of the survey. The approximate acreage and proportionate extent of each mapping unit are given in table 1.

Amagon Series

The Amagon series consists of nearly level and gently sloping, poorly drained, medium acid to very strongly acid soils on uplands. These soils have a surface layer of dark grayish-brown to gray silt loam. The subsoil is gray silt loam in the upper part and silty clay loam in the lower part. It is mottled with various shades of brown and yellow. The underlying material consists of beds of unconsolidated clay, sand, and silt.

Amagon soils are low in organic-matter content and low in natural fertility. They have slow internal drainage and medium available water capacity.

About 98 percent of the Amagon acreage in this county is in mixed pines and hardwoods. A few small areas are used for pasture.

Amagon silt loam, heavy substratum, 0 to 3 percent slopes (AmB).—This is a poorly drained, gray soil mottled with brown. The main layers of a typical profile are—

0 to 2 inches, dark grayish-brown, friable silt loam.
2 to 8 inches, gray, friable silt loam mottled with yellowish brown.
8 to 36 inches, gray, firm silt loam mottled with yellowish brown.
36 to 43 inches, grayish-brown, plastic silty clay loam mottled with pale brown.
43 to 60 inches, pale-olive, plastic clay.

The organic-matter content is low, and natural fertility is low. Permeability is slow, and the available water capacity is medium. The response to lime and fertilizer is poor. Tilth is poor. Included with this soil in mapping were a few small areas of Susquehanna soils.

Most of this Amagon soil is woodland, but a few areas are used for pasture. (Capability unit IIIw–2; woodland suitability group 8; wildlife suitability group 5)

Amagon silt loam, heavy substratum, 3 to 8 percent slopes (AmC).—This is a poorly drained, gray soil mottled with brown. It is similar to Amagon silt loam, heavy substratum, 0 to 3 percent slopes, but has faster surface runoff and is easier to drain. A few small areas of Susquehanna soils were included with this soil in mapping.

Most of this Amagon soil has never been cleared. The native woodland consists of mixed pines and hardwoods. A few acres are used for pasture. (Capability unit IIIe–1; woodland suitability group 8; wildlife suitability group 5)

Angie Series

The Angie series consists of somewhat poorly drained, medium acid and strongly acid soils on terraces. These soils have a surface layer of dark-gray to grayish-brown silt loam and a subsoil of mottled red, gray, and brown silty clay loam to silty clay. The underlying material is old alluvium washed from the Susquehanna, Boswell, and other soils of the upland.

Angie soils are low in natural fertility. They have slow permeability, slow internal drainage, and medium available water capacity.

Most of the Angie acreage in this county is in pines and hardwoods.

Angie silt loam, 0 to 1 percent slopes (AnA).—This is a somewhat poorly drained soil on stream terraces. The main layers of a typical profile are—

0 to 5 inches, dark grayish-brown, friable silt loam.
5 to 11 inches, yellowish-brown, plastic silty clay loam mottled with gray and yellowish red.
11 to 24 inches, mottled gray, yellowish-brown, and red, plastic silty clay loam.
24 to 43 inches +, gray, plastic silty clay mottled with red, strong brown, and yellowish brown.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Mapping unit	Area	Extent	Mapping unit	Area	Extent
	Acres	*Percent*		*Acres*	*Percent*
Amagon silt loam, heavy substratum, 0 to 3 percent slopes	368	0.1	Savannah very fine sandy loam, 1 to 3 percent slopes	1,721	.4
Amagon silt loam, heavy substratum, 3 to 8 percent slopes	140	(1)	Savannah very fine sandy loam, 3 to 8 percent slopes	32,670	8.5
Angie silt loam, 0 to 1 percent slopes	1,391	.4	Savannah very fine sandy loam, 8 to 12 percent slopes, eroded	638	.2
Angie silt loam, 1 to 3 percent slopes	447	.1	Shubuta fine sandy loam, 3 to 8 percent slopes	1,208	.3
Boswell loam, 1 to 3 percent slopes, eroded	4,532	1.2	Shubuta fine sandy loam, 3 to 8 percent slopes, eroded	2,168	.6
Boswell loam, 3 to 8 percent slopes, eroded	11,219	2.9	Shubuta fine sandy loam, 8 to 12 percent slopes	349	.1
Boswell loam, 8 to 20 percent slopes, eroded	2,500	.6	Shubuta gravelly fine sandy loam, 3 to 8 percent slopes, eroded	572	.1
Bowie fine sandy loam, 1 to 3 percent slopes	228	(1)	Shubuta gravelly fine sandy loam, 8 to 20 percent slopes	432	.1
Bowie fine sandy loam, 3 to 8 percent slopes	3,482	.9	Stough silt loam, 1 to 3 percent slopes	12,873	3.3
Caddo silt loam, 0 to 1 percent slopes	48,956	12.7	Stough silt loam, 3 to 8 percent slopes	10,360	2.7
Caddo silt loam, 1 to 3 percent slopes	434	.1	Susquehanna very fine sandy loam, 0 to 1 percent slopes	367	.1
Cahaba fine sandy loam, 3 to 8 percent slopes, eroded	2,960	.8	Susquehanna very fine sandy loam, 1 to 3 percent slopes, eroded	2,083	.5
Collins silt loam	10,379	2.7	Susquehanna very fine sandy loam, 3 to 8 percent slopes, eroded	5,009	1.3
Falaya silt loam	1,206	.3	Susquehanna very fine sandy loam, 8 to 25 percent slopes	936	.2
Falkner silt loam, 0 to 1 percent slopes	268	.1	Susquehanna silty clay, 0 to 1 percent slopes	406	.1
Falkner silt loam, 1 to 3 percent slopes, eroded	708	.2	Susquehanna silty clay, 1 to 3 percent slopes	228	.1
Gravel pits	308	.1	Tippah silt loam, 0 to 1 percent slopes	1,129	.3
Hatchie silt loam, 1 to 3 percent slopes	255	.1	Tippah silt loam, 1 to 3 percent slopes, eroded	16,222	4.2
Lafe silt loam	898	.2	Tippah silt loam, 3 to 8 percent slopes, eroded	13,919	3.5
Nacodoches gravelly loam, 2 to 8 percent slopes, eroded	3,452	.9	Tippah silt loam, 3 to 8 percent slopes, severely eroded	626	.2
Ochlockonee very fine sandy loam	10,379	2.7	Tippah silt loam, 8 to 20 percent slopes	579	.2
Ochlockonee-Wehadkee association	9,795	2.5	Wehadkee silt loam	33,135	8.6
Pheba very fine sandy loam, 0 to 1 percent slopes	4,722	1.2	Wehadkee soils and Local alluvium	36,211	9.4
Pheba very fine sandy loam, 1 to 3 percent slopes	21,653	5.6	Wehadkee-Falaya association	17,080	4.4
Prentiss very fine sandy loam, 1 to 3 percent slopes	2,525	.7	Wehadkee-Caddo association	3,996	1.0
Prentiss very fine sandy loam, 3 to 8 percent slopes	24,194	6.3	Weston fine sandy loam, 0 to 1 percent slopes	5,498	1.4
Ruston fine sandy loam, 3 to 8 percent slopes	962	.3	Weston fine sandy loam, 1 to 3 percent slopes	609	.2
Ruston fine sandy loam, 3 to 8 percent slopes, eroded	4,204	1.1	Water	920	.2
Saffell gravelly fine sandy loam, 3 to 8 percent slopes	7,394	1.9	Total	384,640	99.9
Saffell gravelly fine sandy loam, 8 to 25 percent slopes	2,737	.7			

[1] Less than 0.05 percent. These small acreages total about 0.1 percent of the county.

The surface layer ranges from dark gray to grayish brown. The subsoil ranges from silty clay loam to silty clay and is mottled with various shades of red, gray, and brown. A few depressed areas are under water for short periods after rains. Included with this soil in mapping were a few small areas of Caddo soils.

The organic-matter content is low, and natural fertility is low. Surface runoff is slow, permeability is slow, and the available water capacity is medium. Tilth is poor.

Most of this soil is in native pines and hardwoods. If fertilized and drained, it is fairly well suited to small grain and pasture. (Capability unit IIIw–2; woodland suitability group 8; wildlife suitability group 2)

Angie silt loam, 1 to 3 percent slopes (AnB).—This is an acid soil on stream terraces. It is similar to Angie silt loam, 0 to 1 percent slopes, but has faster surface runoff and is somewhat better drained. There are no depressed areas. Included with this soil in mapping were a few small areas of Prentiss soils.

Most of this Angie soil is in mixed pines and hardwoods. It is fairly well suited to small grain and pasture but is better suited to use as woodland or as wildlife habitat. (Capability unit IIIe–1; woodland suitability group 8; wildlife suitability group 2)

Boswell Series

The Boswell series consists of nearly level to moderately steep, moderately well drained, acid soils. These soils are on the higher ridges in the uplands. Their surface layer is dark-gray or grayish-brown to brown loam to gravelly fine sandy loam. The upper part of their subsoil is red to yellowish-red clay, and the lower part is mottled red, brown, and gray plastic clay. The underlying material consists of beds of unconsolidated sand, silt, and clay.

Boswell soils are low in organic-matter content and low in natural fertility. They have slow internal drainage, slow permeability, and medium available water capacity. The response to fertilizer is moderate. Tilth is maintained easily, and the soils are easy to cultivate unless erosion has exposed the subsoil. On the steeper slopes, runoff is rapid and the erosion hazard is severe.

About 10 percent of the Boswell acreage in this county is used for cultivated crops and pasture. The rest is in pines and hardwoods. If these soils are properly fertilized and protected from erosion, they are fairly well suited to most of the crops and pasture plants commonly grown in this county.

Boswell loam, 1 to 3 percent slopes, eroded (BoB2).—This is a moderately well drained, medium acid soil on uplands. The main layers of a typical profile are—

0 to 6 inches, dark grayish-brown, friable loam.
6 to 18 inches, red, plastic clay.
18 to 50 inches, mottled red, brown, and gray, plastic clay.

Some of the surface layer has been removed by erosion. Where cultivated, this layer is lighter colored than typical and is marked by a few rills and scattered shallow gullies. In a few spots it is reddish because the subsoil is exposed or because subsoil material has been mixed with the surface soil. Included with this soil in mapping were small areas of Susquehanna soils and small gravelly areas.

The organic-matter content is low, and natural fertility is low. Permeability is slow in the subsoil, and the available water capacity is medium. Surface runoff is medium. The response to lime and fertilizer is moderate. Tilth is good, except in severely eroded spots where the clay subsoil is exposed or has been mixed with the surface layer.

Most of this soil is in mixed pines and hardwoods. Some areas were once cultivated but have reverted to woodland through natural reseeding or have been replanted with pine seedlings. Most of the common crops and pasture plants grow fairly well if this soil is properly fertilized and protected from erosion. (Capability unit IIIe–1; woodland suitability group 8; wildlife suitability group 2)

Boswell loam, 3 to 8 percent slopes, eroded (BoC2).—This is a moderately well drained soil on uplands. It is similar to Boswell loam, 1 to 3 percent slopes, eroded, but surface runoff is faster and the erosion hazard is more severe. Included with this soil in mapping were a few spots of Susquehanna and Tippah soils and a few gravelly spots.

A large part of this Boswell soil is in mixed pines and hardwoods. Most of the areas that were once cultivated have reverted to woodland through natural reseeding or have been replanted with pine seedlings. Most small grain and pasture plants grow fairly well if this soil is properly fertilized and protected from erosion. (Capability unit IVe–1; woodland suitability group 8; wildlife suitability group 2)

Boswell loam, 8 to 20 percent slopes, eroded (BoE2).—This is a moderately well drained soil on uplands. It is similar to Boswell loam, 1 to 3 percent slopes, eroded, but surface runoff is faster and the erosion hazard is more severe. Included with this soil in mapping were small areas of Susquehanna and Tippah soils and small gravelly areas.

Most of this Boswell soil is in native vegetation, which consists of pines and hardwoods. A few small areas are used for pasture; row crops are not suited. Those areas that have been cleared are reverting to woodland through natural reseeding or through replanting with pine seedlings. This soil is suitable for woodland and wildlife habitats. (Capability unit VIIe–1; woodland suitability group 12; wildlife suitability group 2)

Bowie Series

The Bowie series consists of moderately well drained, medium acid soils on uplands. These soils occur in nearly level and gently sloping areas and are mainly in the central and western parts of this county. The surface layer is dark grayish-brown to yellowish-brown fine sandy loam, and the subsoil is yellow to yellowish-brown fine sandy loam to sandy clay loam. The lower part of the subsoil is splotched or mottled with red, gray, and brown. The underlying material consists of beds of unconsolidated sand, silt, and clay.

Bowie soils are medium in organic-matter content and medium in natural fertility. They have moderate permeability and medium available water capacity. The response to lime and fertilizer is moderate. Tilth is maintained easily, but the stronger slopes are subject to severe erosion.

About 10 percent of the Bowie acreage in this county is in cultivated crops and pasture. The rest is in mixed pines and hardwoods. Most of the crops and pasture plants commonly grown in the county are fairly well suited.

Bowie fine sandy loam, 3 to 8 percent slopes (BwC).—This is a moderately well drained soil on uplands. The main layers of a typical profile are—

0 to 12 inches, grayish-brown, friable fine sandy loam.
12 to 30 inches, yellowish-brown, slightly plastic sandy clay loam.
30 to 48 inches, yellowish-brown, slightly plastic sandy clay loam or loam mottled with gray, brown, and red.

The surface layer ranges from grayish brown to yellowish brown. The depth to mottling ranges from 25 to 40 inches. Included with this soil in mapping were small areas of Savannah and Ruston soils.

This Bowie soil is easy to keep in good tilth. The response to lime and fertilizer is moderate. The available water capacity is medium, and permeability is moderate. Surface runoff is medium. Erosion is a severe hazard.

Most of this soil is in pines and hardwoods. It is well suited to most row crops and pasture plants grown in the county. (Capability unit IIIe–2; woodland suitability group 13; wildlife suitability group 3)

Bowie fine sandy loam, 1 to 3 percent slopes (BwB).—This is a moderately well drained soil on uplands. It is similar to Bowie fine sandy loam, 3 to 8 percent slopes, but runoff is slower, the erosion hazard is less severe, and good tilth is easier to maintain.

Most of this soil is in cultivated crops and pasture. It is well suited to most row crops and pasture plants grown in the county. (Capability unit IIe–1; woodland suitability group 13; wildlife suitability group 3)

Caddo Series

The Caddo series consists of level and nearly level, poorly drained, medium acid to very strongly acid soils on uplands and terraces. These soils have a surface layer of dark grayish-brown or gray to pale-brown silt loam mottled with various shades of brown. The subsoil is gray silt loam to silty clay loam mottled with

brown and yellow. The underlying material consists of beds of unconsolidated sand, silt, and silty clay.

Caddo soils contain little organic matter. They have slow runoff, very slow permeability in the subsoil, and medium available water capacity. Tilth is poor. The response to lime and fertilizer is poor.

About 5 percent of the Caddo acreage in this county is used for pasture and small grain. The rest is in pines and hardwoods. If these soils are drained and fertilized, they are fairly well suited to small grain and the common pasture plants.

Caddo silt loam, 0 to 1 percent slopes (CaA).—This is a poorly drained, medium acid or strongly acid soil on uplands. The main layers of a typical profile are—

0 to 10 inches, light brownish-gray, friable silt loam mottled with pale brown and brownish yellow.
10 to 20 inches, light-gray, friable silt loam mottled with pale brown and brownish yellow.
20 to 56 inches +, gray, friable silt loam mottled with brown, yellowish brown, and brownish yellow.

The mottles range from few to many and are in various shades of brown and yellow. Included with this soil in mapping were a few small areas of Hatchie and Falkner soils.

The natural fertility of this Caddo soil is low. Surface runoff is slow, permeability is slow, and the available water capacity is medium. The water table is high. Tilth is poor. Poor drainage is a hazard in winter and spring, and drought in summer.

Most of this soil is in pines and hardwoods. A few acres are used for pasture and small grain. (Capability unit IIIw–1; woodland suitability group 6; wildlife suitability group 1)

Caddo silt loam, 1 to 3 percent slopes (CaB).—This is a poorly drained soil. It is similar to Caddo silt loam, 0 to 1 percent slopes, but has faster surface runoff and is easier to drain and to till.

Most of this soil is in native vegetation, which consists of pines and hardwoods. Small areas are used for pasture and small grain. (Capability unit IIIw–1; woodland suitability group 6; wildlife suitability group 1)

Cahaba Series

The Cahaba series consists of well-drained, medium acid and strongly acid soils on stream terraces. These soils are scattered throughout the county and occur as small areas near the larger streams. Their surface layer is dark grayish-brown to yellowish-brown fine sandy loam, and their subsoil is yellowish-red to strong-brown fine sandy loam to sandy clay.

Cahaba soils are medium in organic-matter content and medium in natural fertility. They have moderate permeability and medium available water capacity.

About half the Cahaba acreage in this county is used for cultivated crops and pasture. The rest is in native vegetation, which consists of pines and hardwoods.

Cahaba fine sandy loam, 3 to 8 percent slopes, eroded (CbC2).—This is a well-drained, acid soil on stream terraces. The main layers of a typical profile are—

0 to 6 inches, dark grayish-brown, friable fine sandy loam.
6 to 23 inches, yellowish-red, friable sandy clay loam.
23 to 44 inches, strong-brown, firm sandy clay loam.
44 to 56 inches +, yellowish-red, friable fine sandy loam mottled with brown.

The surface layer is as much as 18 inches thick in some places and in small areas contains quartz gravel and a few chert fragments. In a few small areas the subsoil is fine sandy loam, and in some it is yellowish brown. Rills and shallow gullies are common. Included with this soil in mapping were a few small areas of Prentiss soils.

The organic-matter content is medium, and natural fertility is medium. Runoff is medium, permeability is moderate, and the available water capacity is medium. Tilth is good. The response to lime and fertilizer is good.

Most of this soil is in pines and hardwoods. It is well suited to all row crops and pasture plants grown in the county and is especially well suited to early crops. (Capability unit IIIe–2; woodland suitability group 5; wildlife suitability group 3)

Collins Series

The Collins series consists of nearly level, moderately well drained, medium acid to very strongly acid soils on bottom lands. These soils formed in recent alluvium. They are on the flood plains of the larger streams and are scattered throughout this county. Their surface layer is dark-brown to dark-gray silt loam. The upper part of the subsoil is brown silt loam or loam to a depth of 16 to 30 inches, and the lower part is gray silt loam mottled with brown and yellowish brown. In some places there are layers of clay and sandy clay at a depth of more than 20 inches.

Collins soils are medium in organic-matter content. They have moderate permeability and high available water capacity. Some areas are flooded occasionally.

Most of the Collins acreage in this county is in native vegetation, which consists of bottom-land hardwoods and a few scattered loblolly pines.

Collins silt loam (0 to 1 percent slopes) (Co).—This is a moderately well drained, acid soil on bottom lands. The main layers of a typical profile are—

0 to 10 inches, dark-brown, friable silt loam.
10 to 21 inches, brown, friable silt loam.
21 to 60 inches +, gray, sticky silt loam mottled with brown and yellowish brown.

The surface layer ranges from dark brown to brown. The depth to mottling ranges from 16 to 30 inches. Included with this soil in mapping were a few areas of Falaya and Ochlockonee soils and a few small spots that have a very fine sandy loam surface layer.

The organic-matter content of this Collins soil is medium. Permeability is moderate, and the available water capacity is high. Tilth is easy to maintain. Some areas of this soil are flooded occasionally, but most floods occur in winter and early in spring.

Most of this soil is in native vegetation, which consists of bottom-land hardwoods and a few scattered loblolly pines. Some small areas are used for row crops and pasture. (Capability unit I–1; woodland suitability group 1; wildlife suitability group 1)

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Falaya Series

The Falaya series consists of somewhat poorly drained, acid soils on flat, frequently flooded, active flood plains of streams. These soils formed in recent alluvium. They have a surface layer of dark-gray to brown silt loam and a subsoil of gray silt loam to silty clay loam mottled with brown and yellowish brown. Mottling begins at a depth of 8 to 16 inches.

Falaya soils are medium in organic-matter content. Runoff is slow, permeability is slow, and the available water capacity is high.

Most of the Falaya acreage in this county is in bottomland hardwoods and a few loblolly pines. A few acres are used for summer pasture.

Falaya silt loam (0 to 1 percent slopes) (Fa).—This is a somewhat poorly drained, medium acid to very strongly acid soil on bottom lands. The main layers of a typical profile are—

0 to 9 inches, dark yellowish-brown, friable silt loam.
9 to 15 inches, yellowish-brown, friable silt loam.
15 to 50 inches +, gray, sticky silt loam mottled with yellowish brown and brown.

The depth to the mottled layer ranges from 8 to 16 inches. In some places this horizon contains thin layers of silty clay loam. Included with this soil in mapping were a few small areas of Wehadkee and Collins soils.

The organic-matter content is medium. Permeability is moderate, internal drainage is slow, and the available water capacity is high. Floods are frequent.

Most of this soil is in native vegetation, which consists of bottom-land hardwoods and a few loblolly pines. A few acres are used for summer pasture. (Capability unit Vw–1; woodland suitability group 3; wildlife suitability group 1)

Falkner Series

The Falkner series consists of level and nearly level, somewhat poorly drained, medium acid and strongly acid soils on uplands. These soils occur at the northeastern edge of this county. They developed in a mantle of loess that ranges from a few inches to 30 inches in thickness. Their surface layer is dark grayish-brown to yellowish-brown silt loam, and their subsoil is yellowish-brown to brown silt loam to silty clay loam. Below the subsoil is Coastal Plain material consisting of mottled red, gray, and brown clay to silty clay loam.

Falkner soils are medium to low in organic-matter content and medium to low in natural fertility. They have a slowly permeable subsoil and medium available water capacity.

About 75 percent of the Falkner acreage in this county is in native vegetation, which consists of hardwoods and a few pines. The rest is used for crops and pasture plants commonly grown in the county.

Falkner silt loam, 0 to 1 percent slopes (FkA).—This is a somewhat poorly drained soil on uplands. It has a thin mantle of loess. The main layers of a typical profile are—

0 to 8 inches, grayish-brown, friable silt loam.
8 to 20 inches, yellowish-brown, friable silt loam or light silty clay loam.
20 to 42 inches +, mottled red, gray, and yellowish-brown, plastic clay.

The surface layer is 6 to 12 inches thick, and the depth to the mottled horizon ranges from 14 to 30 inches. Included with this soil in mapping were small areas of Hatchie and Caddo soils.

The natural fertility of this Falkner soil is low to medium, and the organic-matter content is low to medium. Surface runoff is slow, permeability is slow in the subsoil, and the available water capacity is medium. Tilth is good.

Most of this soil is in native vegetation, which consists of hardwoods and a few pines. If it is properly fertilized, it is fairly well suited to late crops and to most pasture plants commonly grown in the county. (Capability unit IIIw–2; woodland suitability group 8; wildlife suitability group 2)

Falkner silt loam, 1 to 3 percent slopes, eroded (FkB2).—This is a somewhat poorly drained soil on uplands. It has a thin cover of loess. It is better drained than Falkner silt loam, 0 to 1 percent slopes. The surface layer is marked by a few rills and shallow gullies caused by concentrated runoff from areas upslope. Included with this soil in mapping were a few small spots of Hatchie and Caddo soils and of a Falkner soil on slopes of 3 to 8 percent.

Most of this Falkner soil is in cultivated crops and pasture. If this soil is properly fertilized and is protected from runoff, it is fairly well suited to most crops and pasture plants commonly grown in this county. (Capability unit IIIw–2; woodland suitability group 8; wildlife suitability group 2)

Gravel Pits

Gravel pits (Gp) are on the higher ridges in this county. They range from 1 to 20 acres in diameter and from 5 to 25 feet in depth. About 90 percent of the acreage is in Saffell soils; the rest is in Boswell, Nacogdoches, and Ruston soils.

This land type is not suitable for cultivation or pasture without extensive landforming. Reclamation has not been attempted. Pits that have been abandoned revert naturally to trees and are suitable for use as woodland and wildlife habitat. (Capability unit VIIe–1; woodland suitability group 16; wildlife suitability group 3)

Hatchie Series

The Hatchie series consists of nearly level, somewhat poorly drained soils that have a thin mantle of loess. These soils occur at the northeastern edge of this county. Their surface layer is dark grayish-brown to pale-brown silt loam, and their subsoil is light yellowish-brown to pale-brown silt loam to silty clay loam mottled with gray and shades of brown. A fragipan begins at a depth of 18 to 30 inches. Below the subsoil is Coastal Plain sand, silt, and clay.

Hatchie soils are low in natural fertility. They have medium runoff, slow permeability, and medium available water capacity. Tilth is fair to poor. The response to lime and fertilizer is poor to moderate.

Most of the Hatchie acreage in this county supports mixed hardwoods and a few scattered pines.

Hatchie silt loam, 1 to 3 percent slopes (HaB).—This is a somewhat poorly drained soil on uplands. It has a thin cover of loess. The main layers of a typical profile are—

0 to 3 inches, dark grayish-brown silt loam.
3 to 7 inches, pale-brown, friable silt loam.
7 to 22 inches, pale-brown silt loam or light silty clay loam mottled with gray and brown; blocky structure.
22 to 42 inches, pale-brown silt loam or light silty clay loam mottled with gray and yellowish brown; very compact and brittle.
42 to 60 inches +, mottled gray and yellowish-brown silt loam; blocky structure.

The depth to the fragipan ranges from 18 to 30 inches. Included with this soil in mapping were a few small spots of Falkner and Caddo soils.

The natural fertility of this Hatchie soil is low. Runoff is medium, permeability is slow, and the available water capacity is medium. Tilth is poor to fair. The response to lime and fertilizer is poor to moderate.

Most of this soil is in mixed hardwoods and a few scattered pines. If properly fertilized, it is fairly well suited to late row crops and to most pasture plants. (Capability unit IIw–1; woodland suitability group 6; wildlife suitability group 4)

Lafe Series

The Lafe series consists of somewhat poorly drained and poorly drained soils that are slightly acid or neutral in the surface layer and strongly alkaline in the subsoil. These soils, locally known as prairie soils, occur on terraces along the Saline River, near Kingsland. They are mostly level or depressional, but mounds from 50 to 100 feet in diameter and from 3 to 4 feet in height cover about 10 percent of the surface area. The surface layer is coarser textured on the mounds than between them.

The surface layer of these soils is grayish-brown to pale-brown silt loam to very fine sandy loam. The subsoil is silt loam to silty clay with lenses of silt and clay. It is dark brown to pale brown and is mottled with various shades of brown, yellow, and gray. Concretions of calcium carbonate are common throughout the profile in most places, and the content of sodium and magnesium is high. Below the subsoil is fine-textured material washed from the uplands or deposited by streams.

Lafe soils are low in natural fertility and contain little organic matter. Runoff is slow, and permeability is very slow.

The natural vegetation is a sparse cover of native grasses and forbs. Stunted pines and post oaks grow on the mounds and around the edges of the soil areas.

Lafe silt loam (0 to 1 percent slopes) (La).—This is a somewhat poorly drained and poorly drained, alkaline soil on stream terraces. The main layers of a typical profile in the intermound areas are—

0 to 6 inches, grayish-brown, friable silt loam.
6 to 14 inches, pale-brown, friable silt loam mottled with brownish yellow.
14 to 32 inches, dark-brown, friable silt loam mottled with brown and pale brown.
32 to 70 inches +, mottled gray and yellowish-brown, plastic clay loam with thin lenses of silt and clay.

The surface layer ranges from 2 to 8 inches in thickness. In spots the texture is very fine sandy loam. The subsoil is dominantly silty clay loam but contains some lenses of clay and silt. In color it ranges from dark brown to pale brown mottled with various shades of brown, yellow, and gray. Calcium carbonate concretions, ranging from few to many, occur throughout the profile in some places. About 10 percent of the surface is covered by mounds 50 to 100 feet in diameter and 3 to 4 feet high.

The organic-matter content of this soil is low, and natural fertility is low. Runoff is slow, and permeability is very slow.

This soil is in native vegetation, which consists of a sparse cover of three-awn grass and annual lespedeza. It is used only for early spring grazing. Stunted pines and post oaks grow on the mounds and around the edges of the soil areas. (Capability unit VIs–1; woodland suitability group 18; wildlife suitability group 5)

Nacogdoches Series

The Nacogdoches series consists of well-drained, medium acid and strongly acid soils on uplands. These soils have a surface layer of dark reddish-brown to red gravelly loam that contains fragments of ironstone and sandstone of various sizes and in various amounts. The upper part of the subsoil is clay loam that ranges from dark red to reddish brown and contains much gravel. The lower part is mottled red, gray, yellow, and brown clay; it contains much fine gravel or laminated layers of ironstone and sandstone. The underlying material consists of beds of unconsolidated sand, silt, clay, and gravel.

Nacogdoches soils are medium in organic-matter content and medium to high in natural fertility. They have moderate permeability and medium available water capacity.

Nacogdoches gravelly loam, 2 to 8 percent slopes, eroded (NaC2).—This is a well-drained, highly productive soil on uplands. The main layers of a typical profile are—

0 to 8 inches, dark-red, friable gravelly loam; sandstone and ironstone gravel as much as one-fourth inch in diameter.
8 to 25 inches, red, sticky gravelly clay loam; gravel as much as 2 inches in diameter.
25 to 50 inches, mottled red, gray, brownish-yellow, and dark-gray, plastic clay; ironstone and sandstone gravel.

The surface layer ranges from dark reddish brown to red, and the amount and size of the gravel vary slightly from one place to another. Rills and a few shallow gullies are common. The depth to clay ranges from 20 to 30 inches. Included with this soil in mapping were a few acres of Shubuta and Susquehanna soils.

The natural fertility of this Nacogdoches soil is medium to high, and the organic-matter content is medium. The available water capacity is moderate. Tilth is fair to good. The response to lime and fertilizer is good.

Most of this soil is in cultivated crops and pasture. A few acres are in mixed pines and hardwoods. All the common row crops and pasture plants can be grown if this soil is properly fertilized and is protected from erosion. (Capability unit IIIe–2; wodland suitability group 15; wildlife suitability group 2)

Ochlockonee Series

The Ochlockonee series consists of well-drained, medium acid and strongly acid soils on bottom lands. These soils formed in recent alluvium. They are scattered throughout the better drained parts of the bottom lands, near the larger streams. The surface layer is dark-brown to strong-brown very fine sandy loam, and the subsoil is strong-brown to yellowish-brown silt loam to fine sandy loam. In some places the subsoil is mottled with gray below a depth of 30 to 50 inches.

Ochlockonee soils are medium in organic-matter content and high in natural fertility. Permeability is moderate, and the available water capacity is medium.

Most of the acreage of Ochlockonee soils in this county is in native vegetation, which consists of bottom-land hardwoods and a few scattered loblolly pines. Some areas are flooded occasionally.

Ochlockonee very fine sandy loam (0 to 1 percent slopes) (Oc).—This is a brown, well-drained soil on bottom lands. The main layers of a typical profile are—

0 to 10 inches, dark-brown, friable very fine sandy loam.
10 to 27 inches, strong-brown, friable silt loam.
27 to 42 inches, strong-brown, firm loam.
42 to 60 inches, strong-brown, firm loam mottled with gray.

Mottling begins at a depth of 30 to 50 inches. Included with this soil in mapping were small areas of Wehadkee and Collins soils and small areas that have a surface layer of silt loam or fine sandy loam.

The natural fertility of this Ochlockonee soil is high. Permeability is moderate, and the available water capacity is medium. Tilth is good. Some areas are flooded in winter and spring.

Most of this soil is in native vegetation, which consists of bottom-land hardwoods and a few scattered loblolly pines. All the common row crops and pasture plants can be grown. (Capability unit I–1; woodland suitability group 2; wildlife suitability group 1)

Ochlockonee-Wehadkee association (Ow).—This association occurs near the Saline River. It is about 65 percent Ochlockonee soils, 25 percent Wehadkee soils, and 10 percent Collins and Falaya soils. A few small areas have a sandy, yellowish-brown subsoil. Typical profiles of the soils are described under the respective series names.

The soils of this association are poorly drained to well drained. They are subject to frequent flooding. The topography is undulating. Slopes rarely exceed 3 percent.

This association has never been cleared. Most of the woodland stands consist of bottom-land hardwoods and scattered loblolly pines. (Ochlockonee soil, capability unit Vw–1; Wehadkee soil, capability unit VIw–1; both soils in woodland suitability group 2, and in wildlife suitability group 1)

Pheba Series

The Pheba series consists of somewhat poorly drained, medium acid to very strongly acid soils. The surface layer of these soils is dark-gray to brown very fine sandy loam. The subsoil is yellowish-brown silt loam to sandy clay loam mottled with various shades of gray and brown. A fragipan occurs in the lower part of the subsoil. The underlying material consists of beds of unconsolidated sand, silt, and silty clay.

Pheba soils are low in natural fertility. They have slow runoff, slow permeability, and medium available water capacity. Tilth is poor to fair. The response to lime and fertilizer is poor to moderate.

Pheba very fine sandy loam, 0 to 1 percent slopes (PeA).—This is a somewhat poorly drained, mottled soil that has a high water table. The main layers of a typical profile are—

0 to 6 inches, grayish-brown, friable very fine sandy loam mottled with yellowish brown.
6 to 18 inches, yellowish-brown, friable silt loam mottled with gray and brown.
18 to 32 inches, mottled gray, yellowish-brown, and brownish-yellow, compact silt loam.
32 to 50 inches +, mottled gray, brown, and yellowish-brown, firm silty clay loam.

The surface layer ranges from 6 to 10 inches in thickness and from dark gray to brown in color. The subsoil ranges from silt loam to sandy clay loam in texture. A fragipan of irregular thickness begins 18 to 36 inches below the surface. Included with this soil in mapping were a few spots of Caddo soils.

The organic-matter content is low, and natural fertility is low. Surface runoff is slow, permeability is slow, and the available water capacity is medium. Tilth is poor.

Most of this Pheba soil is in native vegetation, which consists of mixed pines and hardwoods. If properly drained and fertilized, this soil is fairly well suited to most row crops and pasture plants commonly grown in the county. (Capability unit IIIw–1; woodland suitability group 6; wildlife suitability group 4)

Pheba very fine sandy loam, 1 to 3 percent slopes (PeB).—This is a somewhat poorly drained, mottled soil that has a high water table. It is similar to Pheba very fine sandy loam, 0 to 1 percent slopes, but has somewhat faster surface runoff and is easier to drain. Included with this soil in mapping were small areas that have a silt loam surface layer.

Most of this Pheba soil is in native vegetation, which consists of mixed pines and hardwoods. If properly drained and fertilized, it is fairly well suited to row crops and pasture plants. (Capability unit IIIw–1; woodland suitability group 6; wildlife suitability group 4)

Prentiss Series

The Prentiss series consists of moderately well drained, medium acid and strongly acid soils. These soils occur on the better drained terraces near the larger streams. Their surface layer is dark grayish-brown to light yellowish-brown very fine sandy loam, and their subsoil is brownish-yellow to yellowish-brown silt loam to silty clay loam. A mottled fragipan begins 18 to 36 inches below the surface. The underlying material was washed from Ruston, Savannah, and Shubuta soils of the upland.

Prentiss soils are medium in natural fertility and medium in organic-matter content. They have medium runoff, slow to moderate permeability in the subsoil, and medium available water capacity. Tilth is good, except where the erosion hazard is severe.

About 20 percent of the Prentiss acreage in this county is cultivated or in pasture. The rest supports mixed pines and hardwoods.

Prentiss very fine sandy loam, 1 to 3 percent slopes (PrB).—This is a moderately well drained, productive soil on stream terraces. The main layers of a typical profile are—

0 to 10 inches, grayish-brown, friable very fine sandy loam.
10 to 26 inches, yellowish-brown, friable silt loam.
26 to 48 inches, light brownish-gray light silty clay loam mottled with gray and brown; firm and brittle.
48 to 62 inches, mottled gray, strong-brown, and yellowish-brown clay loam.

Scattered mounds, 75 to 200 feet in diameter and 2 to 4 feet in height, cover 5 to 7 percent of the surface of some areas.

A fragipan begins at a depth of 18 to 36 inches. It is more strongly developed in some areas than in others. Included with this soil in mapping were a few small areas of Cahaba and Stough soils, of soils that have a silt loam surface layer, and of soils that have a redder subsoil than typical Prentiss soils.

The natural fertility of this Prentiss soil is medium, and the organic-matter content is medium. Runoff is medium, permeability is moderate in the subsoil and slow in the fragipan, and the available water capacity is medium. Good tilth is easy to maintain. The response to lime and fertilizer is good.

Most of this soil is in native vegetation, which consists of mixed pines and hardwoods. If properly fertilized and protected from erosion, it is well suited to most row crops and pasture plants commonly grown in the county. (Capability unit IIe–2; woodland suitability group 7; wildlife suitability group 3)

Prentiss very fine sandy loam, 3 to 8 percent slopes (PrC).—This is a moderately well drained soil on stream terraces. It is similar to Prentiss very fine sandy loam, 1 to 3 percent slopes, but surface runoff is somewhat faster and the erosion hazard is more severe. Included with this soil in mapping were a few small areas of Cahaba and Stough soils, of soils steeper than 8 percent, and of soils that have a silt loam surface layer.

Most of this Prentiss soil is in native vegetation, which consists of mixed pines and hardwoods. If this soil is properly fertilized and protected from erosion, it is well suited to the crops and pasture plants commonly grown in this county. (Capability unit IIIe–4; woodland suitability group 7; wildlife suitability group 3)

Ruston Series

The Ruston series consists of gently sloping, well-drained, medium acid to very strongly acid soils. These soils are on the higher ridges of the upland. Their surface layer is grayish-brown to yellowish-brown fine sandy loam, and their subsoil is strong-brown to yellowish-red sandy loam to sandy clay loam. The underlying material consists of beds of unconsolidated sand, silt, and sandy clay.

Ruston soils are medium in natural fertility. They have good surface and internal drainage, moderate permeability, and medium available water capacity. Tilth is good.

About 20 percent of the Ruston acreage in this county is in cultivated crops and pasture. The rest supports mixed pines and hardwoods.

Ruston fine sandy loam, 3 to 8 percent slopes (RuC).—This is a well-drained, permeable soil on uplands. The main layers of a typical profile are—

0 to 8 inches, yellowish-brown, friable fine sandy loam.
8 to 13 inches, strong-brown, friable loam.
13 to 32 inches, yellowish-red sandy clay loam.
32 to 60 inches, strong-brown, firm sandy clay loam mottled with red, reddish yellow, and gray at a depth of about 44 inches.

The surface layer is lighter colored in cultivated fields than in wooded areas. It generally is 7 to 18 inches thick but is as much as 24 inches thick on the caps of a few small hills. The subsoil is strong-brown to yellowish-red sandy loam to sandy clay loam. The mottles in the lower part range in number from few to many. Chert and quartz gravel is scattered through the profile in places. Included with this soil in mapping were a few small areas of Savannah and Shubuta soils and of soils that have a very fine sandy loam surface layer.

This Ruston soil is medium in natural fertility. Surface runoff is medium, permeability is moderate, and the available water capacity is medium. Tilth is easy to maintain. The response to lime and fertilizer is good.

Most of this soil is in native vegetation, which consists of mixed pines and hardwoods. If properly fertilized and protected from erosion, it is well suited to all row crops and pasture plants commonly grown in the county. It is especially well suited to early crops. (Capability unit IIIe–2; woodland suitability group 13; wildlife suitability group 3)

Ruston fine sandy loam, 3 to 8 percent slopes, eroded (RuC2).—This is a well-drained, permeable soil on uplands. It is similar to Ruston fine sandy loam, 3 to 8 percent slopes, but the surface layer is thinner, surface runoff is faster, and the erosion hazard is more severe. There are small rills and shallow gullies. In a few small spots the reddish subsoil is exposed or has been mixed with the surface soil and has given it a reddish cast. Included with this soil in mapping were a few small areas with a slope range of 8 to 12 percent.

All of this Ruston soil has been cleared, but a large part has reverted to woodland through natural reseeding or has been planted with pine seedlings. If this soil is properly fertilized and protected from further erosion, it is good for most crops and pasture plants commonly grown in the county. It is especially well suited to early crops. (Capability unit IIIe–2; woodland suitability group 13; wildlife suitability group 3)

Saffell Series

The Saffell series consists of gently sloping to moderately steep, well-drained, medium acid and strongly acid, gravelly soils on uplands. The surface layer of these soils is dark-gray to brown gravelly fine sandy loam. The chert and quartz gravel is as much as 2 inches in diameter. The subsoil is yellowish-red to red gravelly sandy loam to sandy clay loam. Below the subsoil is gravelly Coastal Plain material.

Saffell soils are medium in organic-matter content and medium in natural fertility. They have medium surface runoff, moderate to rapid permeability in the subsoil, and low available water capacity. Tillage is difficult because of the gravel.

Large gravel pits are located on these soils (fig. 2).

Saffell gravelly fine sandy loam, 3 to 8 percent slopes (SaC).—This is a deep, well-drained, medium acid or strongly acid soil on uplands. The main layers of a typical profile are—

0 to 11 inches, dark grayish-brown, friable gravelly fine sandy loam.
11 to 30 inches, red, firm gravelly sandy clay loam.
30 to 50 inches +, brown, friable gravelly sandy loam.

The organic-matter content is medium, and natural fertility is medium. Permeability is moderate to rapid, and the available water capacity is low. The response to lime and fertilizer is moderate. Tillage is difficult because of the gravel. Included with this soil in mapping were small areas of Ruston and Shubuta soils and of areas that have a slope range of 1 to 3 percent.

Most of this Saffell soil is in pines (fig. 3) and hardwoods. Most of the common crops and pasture plants grow fairly well if this soil is properly fertilized and protected from erosion. (Capability unit IIIe–2; woodland suitability group 14; wildlife suitability group 3)

Figure 2.—Profile of Saffell gravelly fine sandy loam in a gravel pit. Chert and quartz gravel occurs throughout the profile.

Figure 3.—Natural stand of loblolly pine in an abandoned gravel pit on Saffell gravelly fine sandy loam.

Saffell gravelly fine sandy loam, 8 to 25 percent slopes (SaE).—This is a deep, well-drained soil on uplands. It is similar to Saffell gravelly fine sandy loam, 3 to 8 percent slopes, but runoff is faster and the hazard of erosion is more severe. Included with this soil in mapping were a few acres of eroded and severely eroded Saffell soils.

Native pines and hardwoods cover all but a few acres of this Saffell soil. Pasture plants grow fairly well if this soil is properly fertilized and protected from erosion. (Capability unit VIIe–1; woodland suitability group 14; wildlife suitability group 3)

Savannah Series

The Savannah series consists of nearly level to sloping, moderately well drained, medium acid and strongly acid soils. These soils occur between the high ridges and the broad flats on uplands. They have a surface layer of dark grayish-brown to yellowish-brown very fine sandy loam and a subsoil of yellowish-brown to brown sandy clay loam to loam. A brown and gray mottled fragipan begins at a depth of 18 to 36 inches. The underlying material consists of beds of unconsolidated sand, silt, and sandy clay.

Savannah soils are medium in natural fertility. They have medium available water capacity. The movement of water in their subsoil is restricted by the fragipan. Tilth is easy to maintain. The response to lime and fertilizer is moderate.

A large part of the Savannah acreage in this county is cultivated. The rest is in native vegetation, which consists of mixed pines and hardwoods.

Savannah very fine sandy loam, 1 to 3 percent slopes (ShB).—This is a moderately well drained, productive soil on uplands. The main layers of a typical profile are—

0 to 5 inches, dark grayish-brown, friable very fine sandy loam.

5 to 14 inches, yellowish-brown, friable very fine sandy loam.
14 to 28 inches, yellowish-brown, firm sandy clay loam.
28 to 50 inches, yellowish-brown loam mottled with gray and pale brown; compact and brittle.
50 to 62 inches, mottled gray, red, reddish-yellow, and yellowish-brown, firm sandy clay loam with lenses of clay and sand.

A fragipan begins at a depth of 18 to 36 inches. It is more strongly developed in some places than in others. Included with this soil in mapping were small areas of Ruston and Caddo soils, of eroded Savannah soils, and of soils that have a silt loam or fine sandy loam surface layer.

The natural fertility of this Savannah soil is medium, and the organic-matter content is medium. Surface runoff is medium, permeability is moderate above the fragipan but slow within it, and the available water capacity is medium. Tilth is good.

Most of this soil is in native vegetation, which consists of mixed pines and hardwoods. If this soil is properly fertilized and protected from erosion, it is well suited to most row crops and pasture plants grown in this county. (Capability unit IIe–2; woodland suitability group 13; wildlife suitability group 3)

Savannah very fine sandy loam, 3 to 8 percent slopes (ShC).—This is a moderately well drained soil on uplands. It is similar to Savannah very fine sandy loam, 1 to 3 percent slopes, but surface runoff is faster and the erosion hazard is more severe. Included with this soil in mapping were a few small areas of Ruston soils and of soils with a silt loam or fine sandy loam surface layer.

Most of this Savannah soil has never been cleared. The native woodland consists of mixed pines and hardwoods. If properly fertilized and protected from erosion, this soil is well suited to all the crops and pasture plants commonly grown in this county (fig. 4). (Capability unit IIIe–4; woodland suitability group 13; wildlife suitability group 3)

Savannah very fine sandy loam, 8 to 12 percent slopes, eroded (ShD2).—This is a moderately well drained soil on uplands. It is similar to Savannah very fine sandy loam, 1 to 3 percent slopes, but surface runoff is faster and the hazard of erosion is more severe. There are many small rills and a few shallow gullies. A few spots are so severely eroded that the brown subsoil is exposed.

Figure 4.—**Pensacola bahiagrass planted in rows on Savannah very fine sandy loam, 3 to 8 percent slopes, and well fertilized.**

All of this soil has been cleared, but most of it has reverted to woodland through natural reseeding or has been replanted with pine seedlings. This soil is fairly well suited to small grain and pasture plants if properly fertilized and protected from further erosion. (Capability unit IVe–2; woodland suitability group 13; wildlife suitability group 3)

Shubuta Series

The Shubuta series consists of gently sloping to moderately steep, moderately well drained, medium acid and strongly acid soils. These soils occur as scattered small areas on uplands. Their surface layer is dominantly grayish-brown to yellowish-brown fine sandy loam or gravelly fine sandy loam that is 6 to 14 inches thick. Their subsoil ranges from sandy clay to clay in texture and from red to yellowish red in color. The lower part is mottled red, brown, and gray fine sandy loam to clay stratified with thin beds of sandy material. The underlying material consists of thinly stratified beds of unconsolidated sandy, silty, and clayey Coastal Plain deposits.

Shubuta soils are medium in organic-matter content and medium in natural fertility. They have moderate permeability and medium available water capacity. Tilth is easily maintained. The response to lime and fertilizer is good.

About 10 percent of the Shubuta acreage in this county is in cultivated crops and pasture. The rest is in mixed pines and hardwoods. Most crops commonly grown in the county are well suited.

Shubuta fine sandy loam, 3 to 8 percent slopes (SmC).—This is a deep, moderately well drained, acid soil on uplands. The main layers of a typical profile are—

0 to 7 inches, grayish-brown, friable fine sandy loam.
7 to 14 inches, red sandy clay; slightly plastic.
14 to 25 inches, yellowish-red sandy clay mottled with dark red and reddish yellow; slightly plastic.
25 to 60 inches, mottled dark-red, light-gray, reddish-yellow, and yellowish-brown, firm sandy clay loam with thin layers of fine sandy loam.

The thickness of the surface layer ranges from 6 to 14 inches. The upper part of the subsoil ranges from sandy clay to clay in texture and from red to yellowish red in color. The lower part is sandy clay loam to clay that is stratified with sandy material and is mottled with various shades of brown, gray, and red. Included with this soil in mapping were a few small areas of Susquehanna and Boswell soils.

The organic-matter content of this Shubuta soil is medium, and natural fertility is medium. Surface runoff is medium, permeability is moderate, and the available water capacity is medium. Tilth is easily maintained. The response to lime and fertilizer is good.

Most of this soil is in mixed pines and hardwoods. If properly fertilized and protected from erosion, it is well suited to most row crops and pasture plants commonly grown in the county. (Capability unit IIIe–1; woodland suitability group 8; wildlife suitability group 2)

Shubuta fine sandy loam, 3 to 8 percent slopes, eroded (SmC2).—This is a moderately well drained, acid soil on uplands. It is similar to Shubuta fine sandy loam, 3 to 8 percent slopes, but surface runoff is faster and the surface layer is marked by many rills and a few shallow gullies. In a few severely eroded places, the red subsoil is exposed or has been mixed with the surface layer. In these spots tilth is poor and stands of desirable plants are likely to be poor. Included with this soil in mapping were small areas of Tippah and Boswell soils and small severely eroded areas.

Most of this Shubuta soil is now in cultivated crops and pasture or has been used for those purposes. Some areas have reverted to woodland through natural reseeding or have been planted with pine seedlings. Most of the crops and pasture plants common in this county grow fairly well if this soil is properly fertilized and protected from further erosion. (Capability unit IIIe–1; woodland suitability group 8; wildlife suitability group 2)

Shubuta fine sandy loam, 8 to 12 percent slopes (SmD).—This is a moderately well drained soil on uplands. It is similar to Shubuta fine sandy loam, 3 to 8 percent slopes, but surface runoff is rapid and the hazard of erosion is more severe. Included with this soil in mapping were a few small spots of Shubuta gravelly fine sandy loam and of eroded and severely eroded soils.

Most of this Shubuta soil is in mixed pines and hardwoods. It is fairly well suited to pasture if properly fertilized and protected from erosion but is better suited to use as woodland or as wildlife habitat. (Capability unit IVe–1; woodland suitability group 11; wildlife suitability group 2)

Shubuta gravelly fine sandy loam, 3 to 8 percent slopes, eroded (SnC2).—This is a moderately well drained soil on uplands. Except for its gravel content, it is similar to Shubuta fine sandy loam, 3 to 8 percent slopes. Runoff is faster, and rills and shallow gullies are common. The gravel in the surface layer makes cultivation difficult. Included with this soil in mapping were a few areas of Boswell soils and a few small severely eroded areas.

Most of this Shubuta soil is in cultivated crops and pasture or has been used for those purposes. Some areas have reverted to woodland through natural reseeding or have been planted with pine seedlings. If this soil is properly fertilized and protected from further erosion, it is fairly well suited to most row crops and pasture plants grown in this county. (Capability unit IIIe–1; woodland suitability group 8; wildlife suitability group 2)

Shubuta gravelly fine sandy loam, 8 to 20 percent slopes (SnE).—This is a moderately well drained soil on uplands. Except for its gravel content, it is similar to Shubuta fine sandy loam, 3 to 8 percent slopes, but surface runoff is rapid and the erosion hazard is more severe. Included with this soil in mapping were some areas of Boswell soils and a few eroded areas.

Most of this Shubuta soil is in native vegetation, which consists of mixed pines and hardwoods. It is fairly well suited to pasture if properly fertilized and protected from erosion but is better suited to use as woodland or as wildlife habitat. (Capability unit VIe–1; woodland suitability group 12; wildlife suitability group 2)

Stough Series

The Stough series consists of somewhat poorly drained, medium acid to very strongly acid soils on stream terraces. These soils are extensive along the Saline River and occur also along other streams. Mounds 2 to 4 feet in height and 75 to 150 feet in diameter occur in some areas; they cover less than 7 percent of the surface of any given area.

Stough soils have a dark grayish-brown to pale-brown silt loam surface layer. The subsoil ranges from silt loam to silty clay loam and is mottled with gray and various shades of brown. A fragipan ranging from 4 to 30 inches in thickness begins at a depth of 12 to 36 inches.

These soils are low in natural fertility and low to medium in organic-matter content. They have medium runoff, slow permeability, and medium available water capacity. Tilth is fair.

Most of the Stough acreage in this county is in pines and hardwoods, but a few areas are cultivated or are used for pasture. These soils are fairly well suited to row crops and pasture.

Stough silt loam, 1 to 3 percent slopes (StB).—This is a somewhat poorly drained soil on stream terraces. The main layers of a typical profile are—

0 to 8 inches, grayish-brown, friable silt loam.
8 to 20 inches, light yellowish-brown, friable silt loam or light silty clay loam mottled with gray and brown.
20 to 42 inches, mottled gray, brownish-yellow, and yellowish-brown silty clay loam; hard and compact.
42 to 60 inches, gray, friable silt loam mottled with various shades of brown.

The surface layer is 6 to 12 inches thick and ranges from dark grayish brown to pale brown in color. The mottles in the subsoil vary in number, size, and contrast. The fragipan begins 12 to 36 inches below the surface. A few small areas of Cahaba and Prentiss soils were included with this soil in mapping.

The natural fertility of this Stough soil is low to medium. Runoff is medium, permeability is moderately slow in the subsoil, and the available water capacity is medium. Tilth is fair.

Most of this soil is in native vegetation, which consists of pines and hardwoods. It is fairly well suited to row crops and pasture plants if it is properly fertilized and drained. (Capability unit IIIw–1; woodland suitability group 7; wildlife suitability group 4)

Stough silt loam, 3 to 8 percent slopes (StC).—This is a somewhat poorly drained soil on stream terraces. It is similar to Stough silt loam, 1 to 3 percent slopes, but surface runoff is faster, internal drainage is easier to obtain, and the erosion hazard is more severe.

A few small areas of Prentiss and Cahaba soils were included with this soil in mapping.

Most of this Stough soil is in pines and hardwoods. It is fairly well suited to row crops and pasture plants if it is properly fertilized and protected from erosion. (Capability unit IIIe–3; woodland suitability group 7; wildlife suitability group 4)

Susquehanna Series

The Susquehanna series consists of nearly level to steep, somewhat poorly drained, strongly acid to extremely acid soils. These soils occur as small areas at the higher elevations on uplands. They have a surface layer of dark-gray to grayish-brown very fine sandy loam or silty clay and a subsoil of mottled red, gray, and yellowish-brown clay. The underlying material consists of beds of unconsolidated acid clay or soft clay shale.

Susquehanna soils are low in natural fertility. They have very slow to very rapid runoff, very slow permeability, and medium available water capacity. Tilth is poor.

Most of the Susquehanna acreage in this county is in pines and hardwoods. A few areas are used for small grain and pasture.

Susquehanna very fine sandy loam, 1 to 3 percent slopes, eroded (SvB2).—This is a somewhat poorly drained, highly erodible soil on uplands. The main layers of a typical profile are—

0 to 5 inches, grayish-brown, friable very fine sandy loam.
5 to 16 inches, plastic clay mottled with red, gray, and yellowish red.
16 to 35 inches, gray, plastic clay mottled with red.
35 to 60 inches, light-gray, plastic clay mottled with red and yellowish brown.

The surface layer is 4 to 8 inches thick. Rills and shallow gullies are common, and the clay subsoil is exposed in spots. The mottles of red, gray, and various shades of brown in the subsoil vary considerably in contrast, size, and abundance within short distances. Included with this soil in mapping were a few small areas of Boswell and Tippah soils.

The natural fertility of this Susquehanna soil is low. Runoff is medium, permeability is very slow, and the available water capacity is medium. Generally, cultivation is difficult and tilth is poor.

Most of this soil is in native vegetation, which consists of pines and hardwoods. It is not suited to row crops but, if properly fertilized and protected from erosion, is fairly well suited to small grain. It is better used for pasture, woodland, and wildlife habitat. (Capability unit IVe–1; woodland suitability group 9; wildlife suitability group 5)

Susquehanna very fine sandy loam, 0 to 1 percent slopes (SvA).—This is a somewhat poorly drained soil on uplands. It is similar to Susquehanna very fine sandy loam, 1 to 3 percent slopes, eroded, but surface runoff is very slow and surface drainage is needed. A few depressions are under water for short periods after rains. Included in mapping this soil were a few small areas of Susquehanna silty clay and of Amagon soils.

Most of this Susquehanna soil is in native vegetation, which consists of pines and hardwoods. It is fairly well suited to small grain and pasture if it is properly fertilized and drained. (Capability unit IVs–1; woodland suitability group 9; wildlife suitability group 5)

Susquehanna very fine sandy loam, 3 to 8 percent slopes, eroded (SvC2).—This is a somewhat poorly drained soil on uplands. It is similar to Susquehanna very fine sandy loam, 1 to 3 percent slopes, eroded, but runoff is rapid and the erosion hazard is more severe. Rills are common, and there are a few shallow gullies. The reddish clay subsoil is exposed in severely eroded spots. Included with this soil in mapping were a few small spots of Susquehanna silty clay and of Boswell soils.

Most of this Susquehanna soil has been cultivated but has since reverted to woodland through natural reseeding or has been planted with pine seedlings. It is fairly well suited to pasture plants if it is properly fertilized and protected from further erosion, but it is better used for woodland and wildlife habitat. (Capability unit VIe–1; woodland suitability group 9; wildlife suitability group 5)

Susquehanna very fine sandy loam, 8 to 25 percent slopes (SvE).—This is a highly erodible soil on uplands. It is similar to Susquehanna very fine sandy loam, 1 to 3 percent slopes, eroded, but surface runoff is very rapid and the erosion hazard is more severe. Included with this soil in mapping were a few small areas of Boswell and Tippah soils and of eroded Susquehanna soils.

This Susquehanna soil has never been cleared. The native woodland consists of pines and hardwoods. If properly fertilized and protected from erosion, this soil is fairly well suited to pasture, but it is better suited to use as woodland or as wildlife habitat. (Capability unit VIIe–1; woodland suitability group 10; wildlife suitability group 5)

Susquehanna silty clay, 1 to 3 percent slopes (SuB).—This is a somewhat poorly drained, acid soil on uplands. The main layers of a typical profile are—

0 to 3 inches, dark grayish-brown silty clay; sticky and plastic when wet.
3 to 10 inches, red or reddish-brown, plastic silty clay mottled with gray and yellowish brown.
10 to 20 inches, plastic silty clay mottled with red, gray, and reddish brown.
20 to 50 inches +, gray silty clay or clay mottled with red and brown; very plastic.

The surface layer is 3 to 6 inches thick. The size, abundance, and contrast of the red and gray mottles in the subsoil vary considerably. Included with this soil in mapping were a few small eroded areas and spots of Susquehanna very fine sandy loam and Boswell soils.

The organic-matter content of this Susquehanna soil is low, and natural fertility is low. Surface runoff is medium to rapid, permeability is very slow, and the available water capacity is medium. Tilth is poor.

Most of this soil is in pines and hardwoods. The silty clay surface layer and plastic clay subsoil limit its use. It is only fair for row crops and pasture plants, even if properly fertilized and protected from erosion. (Capability unit IIIe–1; woodland suitability group 9; wildlife suitability group 5)

Susquehanna silty clay, 0 to 1 percent slopes (SuA).—This is a somewhat poorly drained, acid soil on uplands. It is similar to Susquehanna silty clay, 1 to 3 percent slopes. Surface runoff is very slow, and a few depressed areas are under water for short periods after rains. Drainage is the major problem. Included with this soil in mapping were a few small areas of Boswell soils.

Most of this Susquehanna soil has never been cleared. The native woodland consists of pines and hardwoods. The clay surface layer and plastic clay subsoil limit use. If this soil is properly drained and fertilized, however, it

is fairly well suited to small grain and pasture. It is not suited to row crops. (Capability unit IVs–1; woodland suitability group 9; wildlife suitability group 5)

Tippah Series

The Tippah series consists of level to moderately steep, moderately well drained, medium acid and strongly acid soils on uplands. These soils are most extensive in the northeastern part of the county. Their surface layer is very dark grayish-brown to yellowish-brown silt loam, and their subsoil is yellowish-red to yellowish-brown silt loam to silty clay loam. The lower part of the subsoil is mottled with red and gray at a depth of about 16 to 30 inches. The underlying material is fine-textured Coastal Plain material.

Tippah soils are medium to low in organic-matter content and medium to low in natural fertility. Permeability is slow in the subsoil, and the available water capacity is medium.

About 25 percent of the Tippah acreage in this county is cultivated or in pasture. The rest is in mixed pines and hardwoods. Most row crops and pasture plants common in the county grow well where the slopes are not too steep.

Tippah silt loam, 0 to 1 percent slopes (TaA).—This is a moderately well drained soil on uplands. The main layers of a typical profile are—

0 to 8 inches, grayish-brown, friable silt loam.
8 to 19 inches, brown, friable silt loam.
19 to 30 inches, firm silty clay loam mottled with red, yellowish red, and gray.
30 to 45 inches +, gray, plastic silty clay mottled with red and brown.

The surface layer is 6 to 12 inches thick. The subsoil ranges from yellowish red to yellowish brown in color and from silt loam to silty clay loam in texture. The depth to the mottled horizon ranges from 16 to 30 inches. Included with this soil in mapping were small areas of Susquehanna and Boswell soils and areas that have a surface layer of very fine sandy loam.

This Tippah soil is low to medium in natural fertility and low to medium in organic-matter content. Surface runoff is slow, permeability is slow, and the available water capacity is medium. Tilth is good.

Most of this soil is in native woodland, which consists of mixed pines and hardwoods. If properly fertilized, it is fairly well suited to most of the crops and pasture plants commonly grown in this county. (Capability unit IIw–1; woodland suitability group 8; wildlife suitability group 2)

Tippah silt loam, 1 to 3 percent slopes, eroded (TaB2).—This is a moderately well drained soil on uplands. It has a thinner surface layer than Tippah silt loam, 0 to 1 percent slopes. Runoff is medium, and the erosion hazard is moderate. Rills and shallow gullies are common. The brown subsoil is exposed in a few severely eroded spots. A few small areas of Susquehanna and Boswell soils were included with this soil in mapping.

All of this Tippah soil has been cleared. About half has reverted to woodland through natural reseeding or has been planted with pine seedlings. If this soil is properly fertilized and protected from further erosion, it is fairly well suited to most crops and pasture plants commonly grown in the county. (Capability unit IIe–1; woodland suitability group 8; wildlife suitability group 2)

Tippah silt loam, 3 to 8 percent slopes, eroded (TaC2).—This is a moderately well drained soil on uplands. It is similar to Tippah silt loam, 0 to 1 percent slopes, but the surface layer is thinner and rills and shallow gullies are common. The subsoil is exposed in a few severely eroded spots. Runoff is rapid, the erosion hazard is severe, and tilth is less easily maintained. Included with this soil in mapping were a few small areas of Susquehanna and Savannah soils.

Most of this Tippah soil was once cultivated, but a large acreage has now reverted to woodland through natural reseeding or has been replanted with pine seedlings. If this soil is properly fertilized and protected from further erosion, it is fairly well suited to the common row crops and pasture plants. (Capability unit IIIe–1; woodland suitability group 8; wildlife suitability group 2)

Tippah silt loam, 3 to 8 percent slopes, severely eroded (TaC3).—This is a moderately well drained soil on uplands. It is similar to Tippah silt loam, 0 to 1 percent slopes, but surface runoff is rapid and most of the surface layer has been removed. The subsoil is exposed in large areas, and many shallow gullies have penetrated the upper part. Included with this soil in mapping were a few small areas of Savannah and Boswell soils.

All of this Tippah soil was once cultivated, but most of it has reverted to woodland through natural reseeding or has been replanted with pine seedlings. This soil is not suited to row crops and is poor for small grain and pasture. It is better suited to use as woodland or as wildlife habitat. (Capability unit IVe–1; woodland suitability group 17; wildlife suitability group 2)

Tippah silt loam, 8 to 20 percent slopes (TaE).—This is a moderately well drained soil on uplands. It is similar to Tippah silt loam, 0 to 1 percent slopes, but surface runoff is very rapid and the erosion hazard is severe in cleared areas. A few small eroded areas and spots of Boswell soils were included in mapping this soil.

Most of this Tippah soil is in native woodland, which consists of mixed pines and hardwoods, but a few areas are used for pasture. Because the erosion hazard is severe, this soil is not suitable for cultivation. If properly fertilized, the less sloping areas are fairly well suited to pasture, but they are better used for woodland and as wildlife habitat. (Capability unit VIe–1; woodland suitability group 12; wildlife suitability group 2)

Wehadkee Series

The Wehadkee series consists of deep, poorly drained, acid soils on bottom lands. These soils formed in recent alluvium. They occur on flat, frequently flooded, active flood plains throughout the county. Their surface layer is gray to light brownish-gray silt loam that is mottled in some places with various shades of brown. Their subsoil is gray silt loam to silty clay loam mottled with shades of gray, brown, and yellowish brown.

Wehadkee soils are low in natural fertility. They have slow permeability and medium available water capacity. The response to fertilizer is poor.

The largest areas of these soils occur along Moro Creek and the Saline River. About 98 percent of the acreage is in native vegetation, which consists of hardwoods and a few scattered loblolly pines. Some areas are used for summer pasture.

Wehadkee silt loam (0 to 1 percent slopes) (Wa).—This is a deep, poorly drained soil on bottom lands. The main layers of a typical profile are—

0 to 6 inches, gray silt loam with few, faint, brown mottles.
6 to 30 inches, gray silt loam mottled with brown and yellowish brown.
30 to 45 inches, light-gray silty clay loam mottled with brown and yellowish brown.

The natural fertility is low. Surface runoff is slow, permeability is slow, and the available water capacity is medium. The response to fertilizer is poor. Included with this soil in mapping were a few small areas of Falaya and Collins soils.

About 98 percent of this Wehadkee soil is in native vegetation, which consists of bottom-land hardwoods and a few scattered loblolly pines. A few areas are used for summer pasture. (Capability unit Vw–1; woodland suitability group 4; wildlife suitability group 1)

Wehadkee soils and Local alluvium (Wb).—This is an undifferentiated group of moderately well drained to poorly drained, medium acid or strongly acid soils. About 45 percent of the acreage consists of Wehadkee soils, and the rest consists of soil material that ranges from clay to sand and gravel in texture.

This mapping unit is along intermittent drainageways on uplands and on the bottom lands of Hudgin Creek, at the northeastern edge of the county, and Burnt Connie Creek, in the northwestern part. Floods are frequent both in winter and in summer.

Most of this mapping unit is in hardwoods and a few scattered loblolly pines. A part is used for pasture. The areas are unsuited to crops but are fairly well suited to most pasture plants commonly grown in the county. (Capability unit VIw–1; woodland suitability group 4; wildlife suitability group 1)

Wehadkee-Falaya association (0 to 1 percent slopes) (Wf).—This association consists of poorly drained to well-drained, frequently flooded soils near the Saline River. It is about 60 percent poorly drained Wehadkee soils, 18 percent somewhat poorly drained Falaya soils, 15 percent deep, well-drained soils that have a subsoil of yellowish-brown to brown sandy clay loam, and 7 percent Collins and Ochlockonee soils. Typical profiles of the soils are described under the respective series names.

Most of this association is wooded. The Wehadkee and Falaya soils support good stands of hardwoods and a few scattered loblolly pines. The better drained soils support good stands of hardwoods and mixed pines. (Wehadkee soil, capability unit VIw–1; Falaya soil, capability unit Vw–1; both soils in woodland suitability group 4, and in wildlife suitability group 1)

Wehadkee-Caddo association (0 to 1 percent slopes) (Wc).—This association occurs near the Saline River. It is about 65 percent Wehadkee soils, 30 percent Caddo soils, and 5 percent Collins, Falaya, and Ochlockonee soils. Typical profiles of these soils are described under the respective series names.

The soils of this association are frequently flooded and are poorly drained or somewhat poorly drained. The Caddo soil is not flooded so frequently as the Wehadkee soil, nor is it flooded so deeply nor for so long a time.

This association has never been cleared. It has a heavy growth of timber and underbrush. The Wehadkee soil supports hardwoods and a few scattered loblolly pines. The Caddo soil supports mixed pines and hardwoods. (Wehadkee soil, capability unit VIw–1; Caddo soil, capability unit IIIw–1; both soils in woodland suitability group 4, and in wildlife suitability group 1)

Weston Series

The Weston series consists of somewhat poorly drained, medium acid to very strongly acid soils. These soils are extensive in the level and nearly level parts of the county. They have a surface layer of light brownish-gray to dark grayish-brown fine sandy loam and a subsoil of gray or light-gray sandy loam to silt loam mottled with shades of yellow and brown. In many places the lower part of the subsoil consists of stratified sand, silt, and clay with an average texture of sandy loam or loam. The underlying material consists of beds of unconsolidated sand, silt, and clay.

Weston soils contain little organic matter. They have slow runoff, moderate permeability in the subsoil, and low available water capacity. Tilth is somewhat poor.

About 10 percent of the Weston acreage in this county is used for pasture and small grain. The rest is in pines and hardwoods. If these soils are drained and fertilized, they are fairly well suited to small grain and most of the common pasture plants.

Weston fine sandy loam, 0 to 1 percent slopes (WsA).—This is a somewhat poorly drained, medium acid or strongly acid soil. The main layers of a typical profile are—

0 to 3 inches, grayish-brown fine sandy loam; friable.
3 to 8 inches, pale-brown fine sandy loam faintly mottled with brownish yellow; friable.
8 to 22 inches, gray heavy sandy clay loam with common mottles of brownish yellow; firm to friable.
22 to 50 inches, mottled light-gray, yellowish-brown, and brownish-yellow fine sandy loam; friable.

The surface layer ranges from 6 to 12 inches in thickness. The mottles range from few to many. Included with this soil in mapping were a few small areas of Caddo and Pheba soils.

The natural fertility of this Weston soil is low. Surface runoff is slow, permeability is moderate, and the available water capacity is low. Tilth is somewhat poor. Poor drainage is a hazard in winter and spring, and droughtiness in summer.

Most of this soil is in mixed pines and hardwoods. A few acres are used for pasture and small grain. If properly fertilized and drained, they are fair for these crops. (Capability unit IIIw–1; woodland suitability group 6; wildlife suitability group 4)

Weston fine sandy loam, 1 to 3 percent slopes (WsB).—This is a somewhat poorly drained soil. It is similar to Weston fine sandy loam, 0 to 1 percent slopes, but surface runoff is somewhat faster and drainage is easier. In-

cluded with this soil in mapping were a few small areas of Pheba soils.

Most of this Weston soil is in native vegetation, which consists of mixed pines and hardwoods. If properly fertilized and drained, this soil is fairly well suited to small grain and to the pasture plants commonly grown in the county. (Capability unit IIIw–1; woodland suitability group 6; wildlife suitability group 4)

Use and Management of the Soils

This section discusses general mangement of soils for crops and pasture, management for capability groups of soils, estimated yields of crops, and the use of soils as woodland, for fish and wildlife habitats, and in engineering works.

General Management for Crops and Pasture [1]

Most of the open land in Cleveland County has been row cropped. The better drained soils on the uplands were cropped first and, as new land, were productive. These soils and those adjacent to upland streams make up most of the cropland. The rest is on the bottom lands and alluvial terraces along the Saline River.

Because most of the cultivated land is erodible and low in fertility, careful management and intensive conservation practices are necessary. Management should include (1) choosing a suitable cropping system that provides ample ground cover and leaves large amounts of residue, (2) applying fertilizer and lime in adequate amounts, (3) using proper tillage practices, and (4) installing terraces and diversions, and practicing contour cultivation, drainage, and irrigation.

A suitable cropping system is one that controls erosion, maintains or increases fertility, and improves the physical properties of the soil. Either cover crops or grasses and legumes are needed regularly if the cropping system consists of crops that leave small amounts of residue or if the soil is subject to severe erosion. Residue, if shredded, spread evenly, and left on or near the surface, provides a protective cover and helps to maintain or improve tilth, available water capacity, nutrient-holding capacity, organic-matter content, and cation-exchange capacity.

Most of the soils in Cleveland County are low in organic matter, nitrogen, phosphorus, potassium, and calcium. They need fertilizer for optimum yields. The amount of fertilizer to be applied can be determined either on the basis of field experience or by soil tests made at the soil testing laboratory of the University of Arkansas. Information about arranging for soil tests can be obtained from the county agent. Most of the upland soils of the county are strongly acid and need lime to insure efficient use of fertilizer.

Most of the cultivated soils in Cleveland County are nearly level or gently sloping. Needed for protection against erosion are contour cultivation, terrace systems with outlets and vegetated waterways, and, in a few places, terraces to divert water that runs off higher slopes.

Only high-value crops are irrigated. Farm ponds, irrigation reservoirs, and streams provide the water. Most of the supplemental water is applied by sprinkler systems (fig. 5), but in some places water is applied by furrow irrigation. Drainage generally is not a problem. Most of the poorly drained soils are wooded.

About one-fourth of the acreage now in pasture is improved pasture made up of perennial grasses and legumes that are fertilized and limed. The rest is in native grasses.

The most commonly grown summer perennials are Coastal bermudagrass, common bermudagrass, dallisgrass, carpetgrass, and bahiagrass. Bahiagrass and Coastal bermudagrass, which are fairly new in this county, are highly satisfactory forage plants. Fescue is grown in a few areas and is the only winter perennial grass presently grown in the county.

Common legumes are white clover, crimson clover, ball clover, Austrian Winter peas, vetch, and lespedeza. Small acreages of oats, wheat, rye, and ryegrass supplement the perennial pastures and provide cool-season forage.

Capability Groups of Soils

Capability classification is the grouping of soils to show, in a general way, their suitability for most kinds of farming. It is a practical classification based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment. The soils are classified according to degree and kind of permanent limitation, but without consideration of major and generally expensive landforming that would change the slope, depth, or other characteristics of the soils; and without consideration of possible but unlikely major reclamation projects.

In the capability system, all kinds of soils are grouped at three levels: the capability class, the subclass, and the unit. These are discussed in the following paragraphs.

Capability Classes, the broadest groups, are designated by Roman numerals I through VIII. The numer-

Figure 5.—Sprinkler irrigation of tomatoes on Bowie fine sandy loam.

[1] W. W. Ferguson, management agronomist, Soil Conservation Service, assisted in writing this section.

als indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I. Soils have few limitations that restrict their use.

Class II. Soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Class III. Soils have severe limitations that reduce the choice of plants, or require special conservation practices, or both.

Class IV. Soils have very severe limitations that restrict the choice of plants, require very careful management, or both.

Class V. Soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife food and cover.

Class VI. Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.

Class VII. Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife.

Class VIII. Soils and landforms have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes. No soils in Cleveland County are in class VIII.

Capability Subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or alkaline; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use.

Capability Units are soil groups within the subclasses. All the soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to be similar in productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–1 or IIIe–2. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

The capability units in Cleveland County are discussed in the following paragraphs. The unit designation for each soil in the county can be found in the "Guide to Mapping Units" at the back of the survey.

Capability unit I–1

This capability unit consists of level, moderately well drained and well drained soils on bottom lands that are flooded occasionally in winter and spring. The surface layer of these soils is silt loam to very fine sandy loam and is 10 to 15 inches thick. The subsoil is sandy loam to silty clay loam.

These soils are medium to high in natural fertility and are easy to work. They are medium in organic-matter content and are medium acid or strongly acid. Permeability is moderate to rapid.

Cotton, corn, peas, soybeans, and small grain are suitable cultivated crops. The most suitable pasture plants are dallisgrass, bermudagrass, Pensacola bahiagrass, tall fescue, sericea lespedeza, annual lespedeza, johnsongrass, white clover, crimson clover, and ball clover.

If properly fertilized and tilled, these soils can be used continuously for crops that leave large amounts of residue. If the cropping system consists primarily of low-residue crops, soil-improving grasses and legumes should be grown every 3 or 4 years or a cover crop every year.

Furrow irrigation is feasible if the system is properly designed and constructed.

Capability unit IIe–1

The soils in this unit are nearly level and moderately well drained. They have a surface layer of silt loam to fine sandy loam and a subsoil of sandy clay loam to silty clay.

These soils are moderate to low in natural fertility. They are medium acid or strongly acid. Surface runoff is slow to medium, permeability is moderate, and the available water capacity is medium. Erosion is a hazard. Tilth is fair.

Cotton, corn, cowpeas, tomatoes, Austrian Winter peas, vetch, and small grain are suitable cultivated crops. Dallisgrass, bermudagrass, Pensacola bahiagrass, fescue, annual lespedeza, sericea lespedeza, ball clover, and white clover are suitable pasture plants.

These soils, if adequately fertilized, properly tilled, terraced, and cultivated on the contour, can be used continuously for row crops that leave large amounts of residue. In the absence of terraces, sown crops that leave large amounts of residue can be grown continuously without any special attention to row direction. Contour cultivation is necessary if row crops are grown regularly in a cropping system with grasses and legumes.

Capability unit IIe–2

The soils in this unit are nearly level and moderately well drained. They have a very fine sandy loam surface layer and a sandy loam to silty clay loam subsoil. All contain a fragipan.

These soils are medium in natural fertility. They are medium acid or strongly acid. Surface runoff is medium, permeability is moderate, and the available water capacity is medium. Erosion is a hazard. Tilth is good.

Cotton, corn, peas, tomatoes, vegetables, vetch, and Austrian Winter peas are well suited to these soils. Suitable pasture plants are bermudagrass, dallisgrass, Pensacola bahiagrass, fescue, annual lespedeza, sericea lespedeza, ball clover, and white clover.

These soils, if adequately fertilized, properly tilled, terraced, and cultivated on the contour, can be used continuously for row crops that leave large amounts of residue. In the absence of terraces, sown crops that leave large amounts of residue can be grown continuously without any special attention to row direction.

Capability unit IIw–1

The soils in this unit are level or nearly level and somewhat poorly drained or moderately well drained. They have a surface layer of silt loam and a subsoil of silty clay loam to clay.

These soils are medium to low in natural fertility. They contain little organic matter and are medium acid or strongly acid. They have slow to medium surface runoff, slow permeability, slow internal drainage, and medium available water capacity.

The cultivated crops best suited are cotton, corn, small grain, vetch, and Austrian Winter peas. Suitable pasture plants are dallisgrass, carpetgrass, bermudagrass, Pensacola bahiagrass, fescue, sericea lespedeza, and annual lespedeza.

If properly fertilized, tilled, and drained, these soils can be used continuously for crops that leave large amounts of residue. Graded rows can be used to remove excess surface water.

Capability unit IIIe–1

The soils in this unit are nearly level or gently sloping and moderately well drained or somewhat poorly drained. They have a surface layer of silty clay to gravelly fine sandy loam and a subsoil of clay to sandy clay loam.

These soils are low to medium in natural fertility. They are medium acid to extremely acid. Surface runoff is medium or rapid, permeability is slow or very slow, and the available water capacity is medium. Erosion is a hazard. Tilth is poor to good.

Cotton, corn, small grain, cowpeas, soybeans, and vegetables yield moderately well under intensive management. Suitable pasture plants are bermudagrass, dallisgrass, Pensacola bahiagrass, fescue, annual lespedeza, sericea lespedeza, white clover, ball clover, crimson clover, vetch, and Austrian Winter peas.

The soils in this capability unit can be used safely for cultivated crops, but progressively more intensive conservation measures are needed as the gradient and length of slope increase and the erosion hazard becomes more serious. The use of terraces, contour farming, fertilization, and proper tillage methods permits high-residue, clean-tilled crops to be grown continuously on the gentler slopes, which make up more than 90 percent of the unit. A low-residue crop should be followed by a cover crop.

Capability unit IIIe–2

The soils in this unit are deep, gently sloping, and well drained or moderately well drained. They have a surface layer of fine sandy loam to gravelly loam and a subsoil of friable sandy clay loam. Some are gravelly throughout.

These soils are medium to high in natural fertility and are easy to cultivate. They have medium to rapid surface runoff, moderate permeability, and medium to high available water capacity.

These soils are suitable for cotton, corn, potatoes, and small grain and are especially suitable for early crops, such as tomatoes, watermelons, and vegetables. Suitable grasses and legumes are Pensacola bahiagrass, bermudagrass, Coastal bermudagrass, fescue, sericea lespedeza, annual lespedeza, ball clover, and white clover.

The soils in this capability unit can be used safely for cultivated crops, but progressively more intensive conservation measures are needed as the gradient and length of slope increase and the erosion hazard becomes more serious. The use of terraces, contour farming, fertilization, and proper tillage methods makes it feasible to grow high-residue, clean-tilled crops continuously on the gentler slopes, which make up about 85 percent of the unit. A low-residue crop should be followed by a cover crop.

In many places a compact plowpan develops if these soils are plowed and cultivated continuously to the same depth. The formation of a pan can be prevented by keeping tillage to a minimum, varying the depth of tillage, and plowing only when the moisture content of the soil is favorable.

Capability unit IIIe–3

The soils in this unit are gently sloping and somewhat poorly drained. They have a surface layer of silt loam, a subsoil of silt loam to silty clay loam, and a fragipan in the lower part of the subsoil.

These soils are low in natural fertility. They are medium acid or strongly acid. Surface runoff is medium or rapid, permeability is slow, and the available water capacity is medium. An erosion hazard, wetness in spring, and low fertility are the major limitations.

Corn, small grain, and sorghum are suitable cultivated crops. Dallisgrass, bermudagrass, and Pensacola bahiagrass are suitable pasture grasses, and white clover, vetch, annual lespedeza, and sericea lespedeza are fairly suitable legumes.

The soils in this capability unit can be used safely for cultivated crops, but progressively more intensive conservation measures are needed as the gradient and length of slope increase. The use of terraces, contour farming, fertilization, and proper tillage methods makes it possible to grow high-residue, clean-tilled crops continuously on the gentler slopes, which make up about 95 percent of the unit. A low-residue crop should be followed by a cover crop.

Capability unit IIIe–4

The soils in this unit are gently sloping and moderately well drained. They have a surface layer of very fine sandy loam, a subsoil of silt loam or loam, and a fragipan in the lower part of the subsoil.

These soils are medium in natural fertility and medium acid or strongly acid. Surface runoff is medium or rapid, and the available water capacity is medium. Tilth is good.

Among the suitable cultivated crops are cotton, corn, tomatoes, small grain, and cowpeas. Suitable pasture plants are bermudagrass, Coastal bermudagrass, dallisgrass, Pensacola bahiagrass, sericea lespedeza, annual lespedeza, white clover, ball clover, and vetch.

The soils in this capability unit can be used safely for cultivated crops, but progressively more intensive conservation measures are needed as the gradient and length of slope increase and the erosion hazard becomes more serious. Terracing, contour farming, fertilization, and proper tillage make it possible to grow high-residue, clean-tilled crops continuously on the gentler slopes, which make up about 90 percent of the unit. A low-residue crop should be followed by a cover crop.

Capability unit IIIw–1

The soils in this unit are level or nearly level and poorly drained or somewhat poorly drained. Their surface layer is silt loam to fine sandy loam, and their subsoil is silt loam to silty clay loam.

These soils are low in natural fertility. They contain little organic matter and are medium acid to very strongly acid. Surface runoff is slow to medium, permeability is slow, and the available water capacity is low to medium. Cultivation is somewhat difficult because of wetness.

Drained areas of these soils are fairly well suited to cotton, small grain, and vetch. Suitable pasture plants are bermudagrass, dallisgrass, carpetgrass, Pensacola bahiagrass, annual lespedeza, and white clover (fig. 6).

If these soils are fertilized, properly tilled, and adequately drained, they can be used continuously for cultivated crops that leave large amounts of residue. Soil-improving grasses or legumes should be included regularly in the cropping system. Graded rows can be used to remove excess surface water.

Capability unit IIIw–2

The soils in this unit are level or nearly level and somewhat poorly drained or poorly drained. They have a silt loam surface layer and a clayey subsoil. Some have a mantle of loess about 2 feet thick.

***Figure 6.*—Pasture that contains lespedeza, dallisgrass, and bermudagrass. In foreground, Stough silt loam in capability unit IIIw–1; in background, Tippah silt loam in capability unit IIIe–1.**

These soils are easy to cultivate. They contain a medium amount of organic matter and are medium acid to very strongly acid. Surface runoff is slow, permeability is slow, and the available water capacity is medium.

Cotton, small grain, and cowpeas are fairly well suited. Suitable pasture plants are dallisgrass, bermudagrass, Pensacola bahiagrass, fescue, vetch, white clover, and annual lespedeza.

If the soils in this unit are fertilized, properly tilled, and adequately drained, they can be used continuously for cultivated crops that leave large amounts of residue. Soil-improving grasses or legumes should be included regularly if the cropping system consists mostly of low-residue crops. Graded rows can be used to remove excess surface water.

Capability unit IVe–1

The soils in this unit are nearly level to sloping and moderately well drained or somewhat poorly drained. Their surface layer is silt loam to fine sandy loam, and their subsoil is sandy clay loam to clay.

These soils are low to medium in natural fertility. They are medium acid to extremely acid. Surface runoff is medium or rapid, permeability is slow or very slow, and the available water capacity is medium.

If these soils are carefully managed, they are fair for small grain and grain sorghum. Suitable pasture plants are Pensacola bahiagrass, bermudagrass, dallisgrass, white clover, vetch, sericea lespedeza, and annual lespedeza.

High-residue crops can be grown if these soils are terraced, cultivated on the contour, properly tilled, and adequately fertilized. Soil-improving grasses or legumes should be included regularly in the cropping system.

Capability unit IVe–2

The soils in this unit are sloping and moderately well drained. Their surface layer is very fine sandy loam, and their subsoil is silt loam or loam. A fragipan occurs in the subsoil.

These soils are medium in natural fertility and are easy to cultivate. They are medium acid or strongly acid and are medium to low in organic-matter content. Surface runoff is medium or rapid, and the available water capacity is medium.

The soils in this unit are of limited suitability for crops and are better suited to use as permanent pasture, woodland, or wildlife habitat. Under careful management, sown small grains and sorghum grow fairly well. Sericea lespedeza, annual lespedeza, crimson clover, ball clover, and vetch are suitable legumes. Pensacola bahiagrass, dallisgrass, and bermudagrass are suitable pasture grasses.

Controlling erosion is the major management problem. Contour stripcropping makes it possible to grow row crops safely in a cropping system with grasses or legumes. Contour tillage makes it possible to grow sown crops occasionally in a system that includes soil-improving grasses or legumes.

Capability unit IVs–1

In this unit are level, somewhat poorly drained soils on uplands. The surface layer is silty clay to very fine sandy loam, and the subsoil is dense, plastic clay.

These soils are low in natural fertility and are difficult to cultivate. They are strongly acid to extremely acid and contain little organic matter. Runoff is very slow, permeability is very slow, and the available water capacity is medium.

These soils are better suited to woodland, pasture, range, or wildlife habitat than to cultivated crops. They are poor for small grain and other cultivated crops because their surface layer is shallow and their subsoil is dense. The most suitable pasture plants are bermudagrass, dallisgrass, Pensacola bahiagrass, vetch, and annual lespedeza.

If these soils are fertilized and properly tilled, they can be used continuously for cultivated crops grown in a cropping system with sown crops that leave large amounts of residue. If the cropping system consists primarily of low-residue crops, soil-improving grasses or legumes should be grown regularly.

Capability unit Vw–1

In this unit are level soils on frequently flooded bottom lands and terraces. The surface layer is silt loam to sandy loam, and the subsoil is silty clay loam to sandy loam.

These soils are low to medium in organic-matter content and are medium acid to very strongly acid. They have a wide range in permeability. Surface runoff is slow, and floodwaters stand on the surface for long periods, especially in winter and spring.

Because these soils are wet and subject to severe flooding, they are not suitable for cultivated crops. They are more suitable for pasture, woodland, or wildlife habitat. Suitable pasture plants are bermudagrass, carpetgrass, dallisgrass, and annual lespedeza.

Capability unit VIe–1

This capability unit consists of gently sloping to moderately steep, slightly eroded soils on uplands. The surface layer of these soils is silt loam to fine sandy loam or gravelly fine sandy loam, and the subsoil is clayey.

These soils are low to medium in natural fertility. They are medium acid to extremely acid. Surface runoff is medium to very rapid, permeability is slow or very slow, and the available water capacity is medium.

Controlling erosion is the chief management problem. Control of gully erosion is needed in some places. These soils are not suitable for cultivation but can be used for pasture, as woodland, or as wildlife habitat. Suitable pasture plants are annual lespedeza, sericea lespedeza, vetch, bermudagrass, and Pensacola bahiagrass.

Capability unit VIw–1

This capability unit consists of level, poorly drained soils on bottom lands. The flood hazard is severe, and preventing floods would require major reclamation. The soils in this unit have a surface layer of silt loam to fine sandy loam and a subsoil of silty clay loam to fine sandy loam.

These soils are medium acid to very strongly acid. Permeability is slow. Water stands on the surface for long periods in winter and spring.

These soils are not suited to cultivation. They are more suitable for pasture, woodland, or wildlife habitat. Suitable pasture plants are bermudagrass, carpetgrass, dallisgrass, lespedeza, white clover, and vetch.

Capability unit VIs–1

In this unit are poorly drained and somewhat poorly drained soils on terraces. The surface layer is silt loam, and the subsoil is silty clay loam.

These soils are low in natural fertility. They have an acid or neutral surface soil and a strongly alkaline subsoil. The organic-matter content is low. Surface runoff is slow, and permeability is very slow.

The use of these soils is limited by the presence of sodium and magnesium, which, in strong concentrations, are toxic to the common plants.

Most of the acreage has a sparse cover of three-awn grass and annual lespedeza. Small mounds support stunted post oak and pine trees. The vegetation is of little use except as shelter for wildlife.

Capability unit VIIe–1

This capability unit consists of Gravel pits and sloping to steep, well-drained to somewhat poorly drained, slightly to severely eroded soils on uplands. The surface layer and subsoil vary widely in texture.

These soils are low in organic-matter content and are medium acid to extremely acid. Surface runoff is medium to very rapid.

Slope, runoff, and the erosion hazard limit use of this unit to pasture, woodland, or wildlife. Suitable pasture plants are bermudagrass, Pensacola bahiagrass, and sericea lespedeza. Some pastured areas require special practices for control of gullying.

Estimated Yields

Table 2 lists, for each soil in the county, the estimated average yields per acre of the major crops, under two levels of management. The yields are those that can be expected over a period of years, with normal rainfall and without irrigation. The table provides a basis for comparing yields from soils that differ in slope and erosion hazard but that are managed in the same way, and for comparing yields under ordinary and under improved management.

The figures in columns A represent yields to be expected under common management. Under such management, no definite cropping system is used, the need for commercial fertilizer is not determined by soil tests, the choice of crops is not always good, and control of water and erosion is inadequate.

The figures in columns B represent yields to be expected under improved management. Such management includes good choice of crops and good cropping systems; application of correct amounts of commercial fertilizer, lime, and manure; return of organic matter to the soil; proper tillage; and, if needed, control of water and erosion by mechanical methods.

TABLE 2.—*Estimated average acre yields of major crops*

[Yields in columns A are to be expected, over a period of years, under common management, and those in columns B under improved management. Absence of figure indicates that the soil generally is unsuitable for the crop. Gravel pits is not listed]

Mapping unit	Corn		Cotton		Oats		Tomatoes		Lespedeza		Permanent pasture [1]	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb. of lint*	*Lb. of lint*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Animal-unit-months* [2]	*Animal-unit-months* [2]
Amagon silt loam, heavy substratum, 0 to 3 percent slopes									0.5	1.0	2.5	4.5
Amagon silt loam, heavy substratum, 3 to 8 percent slopes									.5	1.0	2.5	4.5
Angie silt loam, 0 to 1 percent slopes					20	40			.8	1.5	3.0	5.0
Angie silt loam, 1 to 3 percent slopes					20	40			.7	1.2	3.0	5.0
Boswell loam, 1 to 3 percent slopes, eroded	15	25	200	300	20	40			.5	1.2	3.0	5.0
Boswell loam, 3 to 8 percent slopes, eroded					15	35			.4	1.0	2.5	4.0
Boswell loam, 8 to 20 percent slopes, eroded											2.0	3.0
Bowie fine sandy loam, 1 to 3 percent slopes	30	60	300	500	30	50	100	300	.8	1.2	4.0	6.5
Bowie fine sandy loam, 3 to 8 percent slopes	25	55	300	500	30	50	100	300	.8	1.2	4.0	6.5
Caddo silt loam, 0 to 1 percent slopes			200	300	20	35			1.0	1.5	4.0	6.0
Caddo silt loam, 1 to 3 percent slopes			200	300	20	35			1.0	1.5	4.0	6.0
Cahaba fine sandy loam, 3 to 8 percent slopes, eroded	20	50	275	450	20	40	75	250	.8	1.2	4.0	6.5
Collins silt loam	40	65	400	675	40	60			1.3	2.3	6.5	9.0
Falaya silt loam									1.0	1.8	3.5	5.5
Falkner silt loam, 0 to 1 percent slopes			250	400	25	45			1.0	1.6	4.0	6.0
Falkner silt loam, 1 to 3 percent slopes, eroded	20	40	240	465	25	45			.7	1.3	3.5	5.5
Hatchie silt loam, 1 to 3 percent slopes			240	400	25	40			1.0	1.5	4.0	6.0
Lafe silt loam											1.0	1.5
Nacogdoches gravelly loam, 2 to 8 percent slopes, eroded	20	40	280	400	20	40	80	275	.7	1.3	4.0	6.0
Ochlockonee very fine sandy loam	40	65	400	650	40	60			1.3	2.3	6.0	9.0
Ochlockonee-Wehadkee association									1.0	1.5	5.0	8.0
Pheba very fine sandy loam, 0 to 1 percent slopes	18	30	215	375	20	40			1.0	1.5	3.0	6.0
Pheba very fine sandy loam, 1 to 3 percent slopes	20	40	240	390	25	45			1.0	1.5	3.0	6.0
Prentiss very fine sandy loam, 1 to 3 percent slopes	25	45	300	500	30	50	100	300	.8	1.8	4.0	6.5
Prentiss very fine sandy loam, 3 to 8 percent slopes	25	45	290	490	25	45	100	300	.9	1.8	4.0	6.0
Ruston fine sandy loam, 3 to 8 percent slopes	25	50	300	525	25	50	100	300	.8	1.6	4.5	7.0
Ruston fine sandy loam, 3 to 8 percent slopes, eroded	20	45	260	410	20	45	75	250	.7	1.5	4.0	6.5
Saffell gravelly fine sandy loam, 3 to 8 percent slopes	16	35	260	400	20	38	60	225	.6	1.0	3.0	4.5
Saffell gravelly fine sandy loam, 8 to 25 percent slopes											2.5	3.0
Savannah very fine sandy loam, 1 to 3 percent slopes	25	50	300	500	30	50	100	300	.8	1.8	4.0	6.5
Savannah very fine sandy loam, 3 to 8 percent slopes	25	45	300	440	25	45	100	300	.6	1.3	3.5	6.0
Savannah very fine sandy loam, 8 to 12 percent slopes, eroded									.3	.8	3.0	4.5
Shubuta fine sandy loam, 3 to 8 percent slopes	20	40	250	400	20	40	75	150	.7	1.5	4.5	6.0
Shubuta fine sandy loam, 3 to 8 percent slopes, eroded	18	35	200	350	18	35	60	100	.5	1.0	4.0	5.5
Shubuta fine sandy loam, 8 to 12 percent slopes											3.5	5.0
Shubuta gravelly fine sandy loam, 3 to 8 percent slopes, eroded	18	30	200	350	18	35	50	90	.5	1.0	3.5	5.0
Shubuta gravelly fine sandy loam, 8 to 20 percent slopes											3.5	5.0
Stough silt loam, 1 to 3 percent slopes			250	400	25	45			1.0	1.5	3.5	6.5
Stough silt loam, 3 to 8 percent slopes			250	400	25	45			1.0	1.5	3.5	6.5
Susquehanna very fine sandy loam, 0 to 1 percent slopes					20	45			.6	1.0	3.0	4.5
Susquehanna very fine sandy loam, 1 to 3 percent slopes, eroded					18	30			.6	1.0	2.5	4.0
Susquehanna very fine sandy loam, 3 to 8 percent slopes, eroded									.4	.6	2.5	3.5
Susquehanna very fine sandy loam, 8 to 25 percent slopes											2.0	3.0
Susquehanna silty clay, 0 to 1 percent slopes					18	35			.7	1.4	3.0	4.5
Susquehanna silty clay, 1 to 3 percent slopes					18	35			.7	1.4	3.0	4.5
Tippah silt loam, 0 to 1 percent slopes	30	50	300	475	25	50	75	150	1.0	2.0	4.5	6.5
Tippah silt loam, 1 to 3 percent slopes, eroded	25	45	230	425	25	45	60	100	.8	1.6	4.0	6.0
Tippah silt loam, 3 to 8 percent slopes, eroded	25	45	200	425	18	40	50	80	.7	1.5	3.5	5.5
Tippah silt loam, 3 to 8 percent slopes, severely eroded									.4	.8	3.0	4.5
Tippah silt loam, 8 to 20 percent slopes									.4	.8	3.0	5.0
Wehadkee silt loam									1.0	1.5	3.0	5.0
Wehadkee soils and Local alluvium									1.0	1.5	3.0	5.0
Wehadkee-Falaya association									1.0	1.5	4.0	5.0
Wehadkee-Caddo association									1.0	1.5	4.0	6.0
Weston fine sandy loam, 0 to 1 percent slopes			240	400	25	40			1.0	1.5	4.0	6.0
Weston fine sandy loam, 1 to 3 percent slopes			240	400	25	40			1.0	1.5	4.0	6.0

[1] Normally consists of bermudagrass or another warm-season grass grown with clover or some other cool-season legume.

[2] Animal-unit-months is a term used to express the number of months that one animal unit can graze 1 acre without injury to the pasture. An animal unit is one cow, one steer, one horse, five hogs, or seven sheep.

Use of the Soils for Woodland [2]

Forest once covered all of Cleveland County except a small prairie just southeast of Saline. The principal commercial trees were loblolly pine, shortleaf pine, oak, sweetgum, and hickory on the uplands and oak, sweetgum, tupelo-gum, loblolly pine, cypress, ash, sycamore, and pecan on the bottom lands.

Forest cover types

The forests in Cleveland County are classified in the following forest cover types (7) [3]: (1) loblolly pine-shortleaf pine, (2) loblolly pine-hardwood, and (3) sweetgum-Nuttall oak-willow oak. The type of natural forest that develops depends mainly on drainage. For example, loblolly pine is a major species on the better drained soils. The areas occupied by the three types in this county generally coincide with the soil associations shown on the colored general soil map at the back of this survey.

The *loblolly pine-shortleaf pine* type predominates on the Savannah-Ruston-Saffell, the Tippah-Pheba-Boswell, and the Nacogdoches-Shubuta-Susquehanna soil associations. Associated types also represented in these areas are the shortleaf pine, the shortleaf pine-oak, the loblolly pine, the swamp chestnut oak-cherrybark oak, the loblolly pine-hardwood, and the sweetgum-Nuttall oak-willow oak types.

The *loblolly pine-hardwood* type predominates on the Caddo-Prentiss-Stough and the Caddo-Falkner-Hatchie soil associations. Also represented in these areas are the loblolly pine, the swamp chestnut oak-cherrybark oak, and the sweetgum-Nuttall oak-willow oak types.

The *sweetgum-Nuttall oak-willow oak* type predominates on the Wehadkee-Ochlockonee-Collins and the

[2] JAMES T. BEENE, woodland conservationist, and IVAN R. PORTER, range conservationist, Soil Conservation Service, assisted in writing this section.

[3] Italic numbers in parentheses refer to Literature Cited, p. 64.

TABLE 3.—*Woodland suitability groups and*

Group and soil symbols	Preferred species	
	In existing stands	For planting
Group 1 (Co)	Loblolly pine, shortleaf pine, cherrybark oak, Shumard oak, sweetgum, black cherry, cottonwood, hackberry, Southern red oak, cow oak, water oak, white oak, willow oak, sycamore, black walnut.	Loblolly pine, cottonwood, cherrybark oak, Shumard oak, sweetgum, sycamore, black walnut.
Group 2 (Oc, Ow)	Loblolly pine, shortleaf pine, cherrybark oak, Shumard oak, sweetgum, black cherry, cottonwood, hackberry, Southern red oak, cow oak, water oak, white oak, willow oak, sycamore, black walnut.	Loblolly pine, cottonwood, cherrybark oak, Shumard oak, sweetgum, sycamore, black walnut.
Group 3 (Fa)	Loblolly pine, shortleaf pine, cherrybark oak, Nuttall oak, Shumard oak, sweetgum, cottonwood, green ash, hackberry, water oak, cypress, cow oak, willow oak, white oak, persimmon, sycamore.	Cottonwood, sweetgum, sycamore, Nuttall oak, green ash, cow oak, cypress, loblolly pine (in old fields).
Group 4 (Wa, Wb, Wf, Wc)	Loblolly pine, cherrybark oak, cottonwood, sweetgum, Nuttall oak, Shumard oak, water oak, cow oak, willow oak, sycamore, cypress, tupelo-gum, green ash, persimmon.	Nuttall oak, sweetgum, cottonwood, cypress, green ash, sycamore, tupelo-gum.
Group 5 (CbC2)	Loblolly pine, shortleaf pine, cherrybark oak, Shumard oak, Southern red oak, cow oak, water oak, white oak, sweetgum.	Loblolly pine, cherrybark oak, sweetgum, Shumard oak.
Group 6 (CaA, CaB, HaB, PeA, PeB, WsA, WsB).	Loblolly pine, shortleaf pine, cherrybark oak, Shumard oak, Southern red oak, cow oak, water oak, white oak, sweetgum.	Loblolly pine, cherrybark oak, sweetgum, Shumard oak.
Group 7 (PrB, PrC, StB, StC)	Loblolly pine, shortleaf pine, cherrybark oak, Shumard oak, Southern red oak, cow oak, water oak, sweetgum, white oak.	Loblolly pine, cherrybark oak, sweetgum, Shumard oak.

See footnotes at end of table.

Wehadkee-Falaya soil associations. Also represented in these areas are the swamp chestnut oak-cherrybark oak and the sugarberry (hackberry)-American elm-green ash forest types.

Management of woodland

The interpretations in this section will help owners and operators of woodland to establish, manage, and harvest tree crops. The basic step in making these interpretations is the rating of each soil according to characteristics that affect the production of trees. Such characteristics are the depth of the soil; arrangement of the layers in the profile; texture, drainage, color, reaction, and consistence of each layer; content of humus and minerals; degree of erosion; and slope. All of these characteristics are discussed in the sections "Descriptions of the Soils," and "Genesis, Morphology, and Classification of the Soils."

Management of woodland can be planned more effectively if soils are grouped according to those characteristics that affect the growth of trees and the management of stands. The soils of Cleveland County have been placed in 18 woodland suitability groups. Each group consists of soils that are about the same in suitability for wood crops, potential productivity, and management requirements.

Table 3 lists the 18 woodland groups and the map symbols that represent the soils in each group. The table shows, for each group, the severity of the soil-related limitations, estimates of productivity for specified trees, and a list of trees preferred for management in existing stands and for planting. These ratings are explained in the following paragraphs. The woodland groups are discussed further on in the text.

Erosion hazard refers to potential sheet and gully erosion. The hazard for each woodland group is rated as *slight*, *moderate*, or *severe* and is based on the slope, the erodibility, and the depth of the soils.

Equipment limitation depends on characteristics and topographic features that restrict the use of conventional

factors in woodland management

Potential productivity			Management problems		
Species	Estimated site class [1]	Average yearly growth [2]	Erosion hazard	Equipment limitation	Seedling mortality
		Bd. ft./acre, Doyle rule			
Loblolly pine	95 to 104	430 to 540	Slight	Slight	Slight.
Shortleaf pine	85 to 94	385 to525			
Cherrybark oak	110 to 119	[3]			
Sweetgum	100 to 109	430 to 550			
Cottonwood	95 to 104	415 to 565			
Loblolly pine	95 to 104	430 to 540	Slight	Moderate	Slight.
Shortleaf pine	85 to 94	385 to 525			
Cherrybark oak	110 to 119	[3]			
Sweetgum	100 to 109	430 to 550			
Cottonwood	95 to 104	415 to 565			
Loblolly pine	90 to 99	365 to 480	Slight	Moderate	Slight.
Cherrybark oak	90 to 99	290 to 395			
Sweetgum	95 to 104	370 to 485			
Cottonwood	100 to 109	495 to 665			
Nuttall oak	100 to 109	410 +			
Loblolly pine	85 to 94	315 to 415	Slight	Severe	Moderate.
Cherrybark oak	85 to 94	240 to 335			
Sweetgum	85 to 94	260 to 360			
Water oak	85 to 94	240 to 335			
Cottonwood	90 to 99	350 to 480			
Nuttall oak	90 to 99	290 to 395			
Loblolly pine	85 to 94	315 to 415	Slight	Slight	Slight.
Shortleaf pine	75 to 84	260 to 370			
Cherrybark oak	85 to 94	240 to 335			
Sweetgum	85 to 94	260 to 360			
Water oak	85 to 94	240 to 335			
Loblolly pine	85 to 94	315 to 415	Moderate	Moderate	Slight.
Shortleaf pine	75 to 84	260 to 370			
Cherrybark oak	85 to 94	240 to 335			
Sweetgum	85 to 94	260 to 360			
Water oak	85 to 94	240 to 335			
Loblolly pine	75 to 84	215 to 305	Moderate	Moderate	Slight.
Shortleaf pine	75 to 84	260 to 370			
Cherrybark oak	85 to 94	240 to 335			
Sweetgum	85 to 94	260 to 360			
Water oak	80 to 89	195 to 280			

TABLE 3.—*Woodland suitability groups and*

Group and soil symbols	Preferred species	
	In existing stands	For planting
Group 8 (AmB, AmC, AnA, AnB, BoB2, BoC2, FkA, FkB2, SmC, SmC2, SnC2, TaA, TaB2, TaC2).	Loblolly pine, shortleaf pine, Southern red oak, sweetgum, cherrybark oak, Shumard oak.	Loblolly pine, shortleaf pine.
Group 9 (SvA, SvB2, SvC2, SuA, SuB).	Loblolly pine, shortleaf pine, Southern red oak, sweetgum, cherrybark oak, Shumard oak.	Loblolly pine, shortleaf pine.
Group 10 (SvE)	Loblolly pine, shortleaf pine, Southern red oak, sweetgum, cherrybark oak, Shumard oak.	Loblolly pine, shortleaf pine.
Group 11 (SmD)	Loblolly pine, shortleaf pine, Southern red oak, sweetgum, cherrybark oak, Shumard oak.	Loblolly pine, shortleaf pine.
Group 12 (BoE2, SnE, TaE)	Loblolly pine, shortleaf pine, Southern red oak, sweetgum, cherrybark oak, Shumard oak.	Loblolly pine, shortleaf pine.
Group 13 (BwB, BwC, RuC, RuC2, ShB, ShC, ShD2).	Loblolly pine, shortleaf pine	Loblolly pine, shortleaf pine.
Group 14 (SaC, SaE)	Loblolly pine, shortleaf pine	Loblolly pine, shortleaf pine.
Group 15 (NaC2)	Loblolly pine, shortleaf pine	Loblolly pine, shortleaf pine.
Group 16 (Gp)	Loblolly pine, shortleaf pine	Loblolly pine, shortleaf pine.
Group 17 (TaC3)	Loblolly pine, shortleaf pine	Loblolly pine, shortleaf pine.
Group 18 (La)	Not suitable for trees	

[1] Site class ratings are adapted from soil-site studies performed by the U.S. Soil Conservation Service and the U.S. Forest Service (*11, 12, 14, 16*).

[2] Yields shown for pine are for well-stocked, even-aged, unmanaged stands to age 60 (*9*). Yields shown for hardwoods are for well-stocked, even-aged, managed stands to age 30 for cottonwood and

equipment for logging, planting, road construction, and other activities. The limitations in Cleveland County are caused primarily by slope, texture of the surface soil, wetness, and flooding.

The limitation is *slight* if the use of equipment is limited only for a short period after a heavy rain. The limitation is *moderate* if the use of equipment is limited by wetness only from November through March, or if the soils are moderately steep or severely eroded. The limitation is *severe* if equipment can be used only in the driest months, July through October, or if the soils are steep or gullied.

Seedling mortality refers to the loss of naturally occurring or planted tree seedlings as a result of soil characteristics, topographic features, or position on the slope. It is assumed that good stock is planted, that seed or an adequate source of seed is present, and that rainfall is normal. The soil characteristics that affect seedling mortality include the texture and the thickness of the surface layer, drainage, depth to the water table, frequency and duration of floods, and degree of erosion.

Mortality is *slight* if less than 25 percent of the seedlings die, *moderate* if 25 to 50 percent die, and *severe* if more than 50 percent die.

Potential productivity indicates the amount of wood products the soils can produce under a given level of management. The important species are listed and are rated according to site class and average yearly growth. Site class, as used in this survey, refers to the average height of the dominant trees in a stand, to the nearest 10-foot interval, at age 30 for cottonwood and age 60 for other trees.

The *preferred species* were selected because of their growth rate, their commercial value, the quality of their

factors in woodland management—Continued

Potential productivity			Management problems		
Species	Estimated site class [1]	Average yearly growth [2]	Erosion hazard	Equipment limitation	Seedling mortality
		Bd. ft./acre, Doyle rule			
Loblolly pine	75 to 84	215 to 305	Slight	Slight	Slight.
Shortleaf pine	65 to 74	170 to 250			
Southern red oak	70 to 79	120 to 185			
Sweetgum	80 to 89	215 to 305			
Loblolly pine	75 to 84	215 to 305	Moderate	Moderate	Moderate.
Shortleaf pine	65 to 74	170 to 250			
Southern red oak	70 to 79	120 to 185			
Sweetgum	80 to 89	215 to 305			
Loblolly pine	75 to 84	215 to 305	Severe	Severe	Moderate.
Shortleaf pine	65 to 74	170 to 250			
Southern red oak	70 to 79	120 to 185			
Sweetgum	80 to 89	215 to 305			
Loblolly pine	75 to 84	215 to 305	Moderate	Slight	Slight.
Shortleaf pine	65 to 74	170 to 250			
Southern red oak	70 to 79	120 to 185			
Sweetgum	80 to 89	215 to 305			
Loblolly pine	75 to 84	215 to 305	Severe	Moderate	Slight.
Shortleaf pine	65 to 74	170 to 250			
Southern red oak	70 to 79	120 to 185			
Sweetgum	80 to 89	215 to 305			
Loblolly pine	75 to 84	215 to 305	Slight	Slight	Slight.
Shortleaf pine	65 to 74	170 to 250			
Loblolly pine	75 to 94	215 to 305	Slight	Moderate	Moderate.
Shortleaf pine	70 to 79	210 to 305			
Loblolly pine	65 to 74	125 to 205	Slight	Slight	Slight.
Shortleaf pine	65 to 74	170 to 250			
Loblolly pine	65 to 74	125 to 205	Moderate	Moderate	Moderate.
Shortleaf pine	65 to 74	170 to 250			
Loblolly pine	65 to 74	125 to 205	Severe	Severe	Severe.
Shortleaf pine	55 to 64	90 to 160			

to age 60 for other hardwoods. These yields are adapted from published research on southern hardwoods (*13*) and upland-central hardwoods (*15*), as well as from soil-site studies performed by the U.S. Soil Conservation Service.

[3] Data not available for oaks with site class greater than 100 feet.

wood products, their resistance to hazards and limitations, and their general use.

Forage production

The grasses, legumes, and forbs and many of the woody plants in the understory of woodland stands can be utilized for forage. Grazing is a suitable secondary use for forests of the pine types. The success of a livestock program depends on the proper use of forage plants, fencing to control the movement of livestock, development of water supplies, and feeding mineral supplements. The intensity of grazing must be controlled so that desirable tree seedlings are not damaged and the forage plants are not overgrazed.

The amount of forage produced in a woodland area varies with the age of the trees and the density of the canopy. For the purposes of this survey, five canopy classes are recognized. Under a *dense* canopy, from 56 to 70 percent of the ground is shaded at midday; under a *medium* canopy, 36 to 55 percent; under a *sparse* canopy, 21 to 35 percent; and under an *open* canopy, 6 to 20 percent. If 5 percent or less of the ground is shaded at midday, there is considered to be *no canopy*. Table 4 shows, by canopy classes, the potential yields of forage for each woodland suitability group.

Woodland suitability groups

The 18 woodland suitability groups in Cleveland County are discussed in the following paragraphs.

WOODLAND SUITABILITY GROUP 1

This group consists of moderately well drained, moderately permeable soils on bottom lands. Both the surface layer and the subsoil are silt loam.

TABLE 4.—*Potential yields of forage in woodland*

Woodland suitability group	Yields, in pounds of dry matter per acre, under—				
	No canopy	Open canopy	Sparse canopy	Medium canopy	Dense canopy
1	6, 000 to 8, 000	5, 500 to 7, 000	4, 000 to 6, 000	2, 000 to 4, 000	0 to 2, 000
2	6, 500 to 7, 500	5, 000 to 6, 500	3, 000 to 5, 000	1, 500 to 3, 000	0 to 1, 500
3	7, 000 to 8, 000	6, 000 to 7, 500	3, 000 to 6, 000	1, 500 to 3, 000	0 to 1, 500
4	4, 500 to 7, 500	3, 000 to 7, 500	3, 000 to 6, 000	2, 000 to 3, 000	1, 000 to 2, 000
5	3, 000 to 5, 000	3, 000 to 4, 500	2, 500 to 4, 000	1, 000 to 2, 500	0 to 1, 000
6	4, 000 to 5, 000	3, 000 to 4, 500	2, 500 to 4, 000	1, 500 to 2, 500	0 to 2, 000
7	4, 000 to 5, 000	3, 000 to 4, 500	2, 500 to 4, 000	1, 500 to 2, 500	0 to 2, 000
8	4, 000 to 6, 000	3, 000 to 5, 000	2, 500 to 4, 000	1, 000 to 3, 000	0 to 1, 500
9	3, 500 to 5, 000	3, 000 to 4, 000	2, 000 to 3, 500	500 to 3, 000	0 to 1, 000
10	4, 000 to 5, 000	3, 000 to 4, 000	2, 000 to 3, 500	1, 000 to 2, 500	0 to 1, 000
11	4, 000 to 6, 000	3, 000 to 5, 000	2, 000 to 4, 000	1, 000 to 2, 500	500 to 1, 000
12	4, 000 to 6, 000	3, 000 to 5, 000	2, 000 to 4, 000	1, 000 to 2, 500	500 to 1, 000
13	4, 500 to 6, 000	3, 000 to 5, 000	2, 500 to 4, 000	2, 000 to 3, 000	0 to 2, 000
14	2, 500 to 4, 000	2, 000 to 3, 500	1, 500 to 2, 500	1, 000 to 2, 000	0 to 1, 000
15	3, 000 to 5, 000	2, 500 to 4, 000	1, 500 to 3, 000	1, 000 to 2, 500	0 to 1, 000
16	2, 500 to 4, 000	2, 000 to 3, 500	1, 500 to 2, 500	1, 000 to 2, 000	0 to 1, 000
17	2, 500 to 5, 000	2, 000 to 4, 000	1, 750 to 3, 000	1, 500 to 2, 000	0 to 1, 000
18	1, 500 to 3, 000	[1]	[1]	[1]	[1]

[1] Does not have canopy of this density.

These soils are highly productive of wood crops and are well suited to pines and hardwoods. The soil-related management problems are no more than slight.

Woody plants in the understory vegetation are huckleberry, hawthorn, poison-ivy, waxmyrtle, and sweetbay. Among the forage plants are eastern gamagrass, plumegrass, switchcane, little bluestem, big bluestem, beaked panicum, low panicums, longleaf uniola, indiangrass, switchgrass, wildrye, sedges, and several kinds of native legumes and forbs. Under an open canopy, all or most of these plants are present. As the canopy closes, many of the less shade-tolerant plants disappear, and there remain only such forage plants as beaked panicum, low panicums, longleaf uniola, switchcane, wildrye, and the sedges, along with the woody plants.

WOODLAND SUITABILITY GROUP 2

This group consists of well-drained and poorly drained, moderately permeable and slowly permeable soils on bottom lands. The surface layer is sandy loam to silt loam, and the subsoil is sandy loam to silty clay loam.

The soils in this group are highly productive of wood crops and are well suited to pines and hardwoods. The soil-related management problems are slight to moderate and are caused chiefly by seasonal flooding.

Woody plants in the understory vegetation are huckleberry, planertree, hawthorn, poison-ivy, waxmyrtle, and sweetbay. Among the forage plants are eastern gamagrass, plumegrass, switchcane, big bluestem, beaked panicum, low panicums, longleaf uniola, indiangrass, switchgrass, wildrye, sedges, rushes, and several kinds of native legumes and forbs. Under an open canopy, all or most of these plants are present. As the canopy closes, many of the less shade-tolerant plants disappear and there remain only such forage plants as beaked panicum, low panicums, longleaf uniola, switchcane, wildrye, and the sedges and rushes, along with the woody plants.

WOODLAND SUITABILITY GROUP 3

This group consists of somewhat poorly drained, slowly permeable soils on bottom lands. Both the surface layer and the subsoil are silt loam.

These soils are highly productive of wood crops and are well suited to loblolly pine and hardwoods. The soil-related management problems are slight to moderate and are caused by seasonal flooding and somewhat poor drainage.

Woody plants in the understory vegetation are hawthorn, waxmyrtle, poison-ivy, honeysuckle, and planertree. Among the forage plants are switchcane, switchgrass, eastern gamagrass, beaked panicum, redtop panicum, low panicums, longleaf uniola, plumegrass, wildrye, sedges, rushes, and several kinds of forbs. As the canopy closes, many of the less shade-tolerant plants disappear, and there remain only such forage plants as switchcane, beaked panicum, redtop panicum, low panicums, longleaf uniola, plumegrass, wildrye, and the sedges and rushes, along with the woody plants.

WOODLAND SUITABILITY GROUP 4

This group consists of poorly drained and somewhat poorly drained, slowly permeable soils. The surface layer is silt loam, and the subsoil is silt loam to silty clay loam.

These soils are highly productive of wood crops and generally are best suited to wetland hardwoods. Loblolly pine grows in some of the better drained areas but is normally a minor part of the stand. The soil-related management problems are slight to severe and are caused by prolonged flooding and poor drainage.

Woody plants in the understory vegetation are waxmyrtle, sweetbay, planertree, swamp privet, and hawthorn. Among the principal forage plants are honeysuckle, switchcane, plumegrass, eastern gamagrass, switchgrass, beaked panicum, redtop panicum, low panicums, Florida paspalum, broadspike uniola, sedges, and

rushes. Most of these plants are somewhat tolerant of shade and will persist if the canopy closes.

WOODLAND SUITABILITY GROUP 5

This group consists of well-drained, moderately permeable soils. The surface layer is fine sandy loam, and the subsoil is sandy clay loam.

These soils are highly productive of wood crops and are well suited to pines and hardwoods. The soil-related management problems are no more than slight.

Woody plants in the understory vegetation are hawthorn, red mulberry, French mulberry, wild grape, dogwood, waxmyrtle, poison-oak, and huckleberry. Among the forage plants are low panicums, beaked panicum, low paspalums, longspike tridens, needlegrass, yuccaleaf eryngo, dryland sedges, bluestem, switchgrass, plumegrass, longleaf uniola, purple lovegrass, and purpletop.

WOODLAND SUITABILITY GROUP 6

This group consists of somewhat poorly drained, slowly permeable soils. The surface layer is sandy loam to silt loam, and the subsoil is sandy loam to silty clay loam.

These soils are highly productive of wood crops and are well suited to pines and hardwoods. The soil-related management problems are slight to moderate and are caused primarily by wetness.

Among the woody plants in the understory vegetation are hawthorn, French mulberry, wild grape, muscadine, waxmyrtle, bush huckleberry, holly, dogwood, dewberry, and peppervine. The principal forage plants are little bluestem, big bluestem, plumegrass, switchgrass, low paspalums, longleaf uniola, beaked panicum, redtop panicum, purple lovegrass, skeletongrass, sedges, rushes, and several kinds of forbs. Bluestem, switchgrass, plumegrass, longleaf uniola, purple lovegrass, and purpletop are dominant in the better drained areas. As the canopy closes, many of the less shade-tolerant plants disappear, and there remain only such forage plants as beaked panicum, redtop panicum, low panicums, longleaf uniola, plumegrass, sedges, and rushes, along with the woody plants.

WOODLAND SUITABILITY GROUP 7

This group consists of moderately well drained and somewhat poorly drained soils that have a fragipan. The surface layer is silt loam or very fine sandy loam, and the subsoil is silt loam to silty clay loam.

These soils are moderately high in productivity for wood crops and are suitable for pines (fig. 7) and hardwoods. The soil-related management problems are slight to moderate and are caused by wetness and erosion.

Among the woody plants in the understory are hawthorn, French mulberry, wild grape, muscadine, waxmyrtle, bush huckleberry, dogwood, redbud, dewberry, and peppervine. The principal forage plants are big bluestem, little bluestem, plumegrass, switchgrass, low panicums, beaked panicum, longleaf uniola, purple lovegrass, skeleton grass, sedges, and several kinds of forbs. As the canopy closes, many of the less shade-tolerant plants disappear, and there remain only such forage plants as beaked panicum, low panicums, longleaf uniola, sedges, and plumegrass, along with the woody plants.

Figure 7.—**Loblolly pine has reforested this area of Stough silt loam in woodland suitability group 7. The cull trees have been killed.**

WOODLAND SUITABILITY GROUP 8

This group consists of moderately well drained to poorly drained, slowly permeable soils. The surface layer is sandy loam to silt loam or gravelly fine sandy loam. The subsoil is clay, sandy clay, or silty clay loam.

These soils are moderately high in productivity for wood crops and are suitable for pines and hardwoods. Pines generally are preferred for planting. The soil-related management problems are slight.

Among the woody plants in the understory vegetation are dogwood, redbud, wild grape, bush huckleberry, French mulberry, hawthorn, and muscadine. The principal forage plants are bluestem, indiangrass, switchgrass, beaked panicum, low panicums, longleaf uniola, low paspalums, skeletongrass, and several kinds of native legumes and forbs. As the canopy closes, the bluestems and many of the other forage plants die out, and there remain principally longleaf uniola, beaked panicum, low panicums, and dryland sedges, along with the woody plants.

WOODLAND SUITABILITY GROUP 9

This group consists of somewhat poorly drained, very slowly permeable soils. The surface layer is very fine sandy loam or silty clay, and the subsoil is clay.

These soils are moderately high in productivity for wood crops and are suitable for pines and hardwoods. Pines generally are preferred for planting. The soil-related management problems are moderate and are caused by heavy clay in the subsoil.

Among the woody plants in the understory are hawthorn, French mulberry, wild grape, waxmyrtle, dogwood, muscadine, bush huckleberry, and holly. The

major forage plants are big bluestem, little bluestem, indiangrass, beaked panicum, low panicums, purpletop, longleaf uniola, and several kinds of legumes and forbs. Beaked panicum, low panicums, and longleaf uniola persist in small quantities, along with the woody plants, after the canopy closes.

WOODLAND SUITABILITY GROUP 10

This group consists of somewhat poorly drained, very slowly permeable soils. The surface layer is very fine sandy loam, and the subsoil is clay.

These soils are moderately high in productivity for wood crops and are suitable for pines and hardwoods. Pines generally are preferred for planting. The soil-related management problems are moderate to severe and are caused by the heavy clay subsoil and the slope.

Among the woody plants in the understory vegetation are wild grape, muscadine, waxmyrtle, dogwood, redbud, bush huckleberry, and holly. The major forage plants are bluestem, indiangrass, beaked panicum, low panicums, purpletop, longleaf uniola, and several kinds of legumes and forbs. Beaked panicum, low panicums, and longleaf uniola persist in small quantities, along with the woody plants, after the canopy closes.

WOODLAND SUITABILITY GROUP 11

This group consists of moderately well drained, moderately permeable soils. The surface layer is fine sandy loam, and the subsoil is sandy clay to clay.

These soils are moderately high in productivity for wood crops and are suitable for pines and hardwoods. Pines generally are preferred for planting. The soil-related management problems are slight to moderate and are caused primarily by the slope.

Among the woody plants in the understory vegetation are hawthorn, French mulberry, wild grape, waxmyrtle, dogwood, muscadine, bush huckleberry, and holly. The major forage plants are bluestem, indiangrass, beaked panicum, low panicums, purpletop, longleaf uniola, and several kinds of forbs. Beaked panicum, low panicums, and longleaf uniola persist in small quantities, along with the woody plants, after the canopy closes.

WOODLAND SUITABILITY GROUP 12

This group consists of moderately well drained, moderately permeable to slowly permeable soils. The surface layer is gravelly fine sandy loam, loam, or silt loam. The subsoil is clay to sandy clay or silty clay loam.

These soils are moderately high in productivity for wood crops and are suitable for pines and hardwoods. Pines generally are preferred for planting. The soil-related management problems are moderate to severe and are caused primarily by slope.

Among the woody plants in the understory vegetation are hawthorn, French mulberry, wild grape, waxmyrtle, dogwood, muscadine, bush huckleberry, and holly. The major forage plants are little bluestem, big bluestem, indiangrass, beaked panicum, low panicums, purpletop, longleaf uniola, and several kinds of forbs. Beaked panicum, low panicums, and longleaf uniola persist in small quantities, along with the woody plants, after the canopy closes.

WOODLAND SUITABILITY GROUP 13

This group consists of well drained and moderately well drained, moderately permeable soils. The surface layer is fine sandy loam or very fine sandy loam, and the subsoil is sandy loam to sandy clay loam.

These soils are moderately high in productivity for wood crops and are better suited to pines than to other trees. The soil-related management problems are slight.

Among the woody plants in the understory vegetation are French mulberry, wild grape, muscadine, waxmyrtle, bush huckleberry, dogwood, redbud, dewberry, peppervine, and yellow jasmine. The major forage plants are big bluestem, little bluestem, plumegrass, switchgrass, longleaf uniola, beaked panicum, low panicums, purple lovegrass, skeletongrass, sedges, and several kinds of forbs. As the canopy closes, many of the less shade-tolerant plants disappear, and there remain only such forage plants as plumegrass, beaked panicum, low panicums, longleaf uniola, and the dryland sedges, along with the woody plants.

WOODLAND SUITABILITY GROUP 14

This group consists of well-drained, moderately permeable soils. The surface layer is gravelly fine sandy loam, and the subsoil is gravelly sandy loam to sandy clay loam.

These soils are moderately high in productivity for wood crops and are better suited to pines than to other trees. The soil-related management problems are slight to moderate and are caused by the high gravel content and the slope.

Among the woody plants in the understory vegetation are hawthorn, wild grape, dogwood, muscadine, and bush huckleberry. The major forage plants are little bluestem, big bluestem, indiangrass, perennial three-awn, beaked panicum, low panicums, purpletop, longleaf uniola, skeletongrass, purple lovegrass, and dryland sedges. Most of these plants remain in the stand as the canopy begins to close, but forage production decreases.

WOODLAND SUITABILITY GROUP 15

This group consists of well-drained, moderately permeable soils. The surface layer is gravelly loam, and the subsoil is sandy clay loam or clay loam.

These soils are moderately productive for wood crops and are better suited to pines than to other trees. The soil-related management problems are slight.

Among the woody plants in the understory vegetation are hawthorn, wild grape, dogwood, muscadine, and bush huckleberry. The major forage plants are little bluestem, big bluestem, indiangrass, perennial three-awn, beaked panicum, low panicums, purpletop, longleaf uniola, skeletongrass, purple lovegrass, and dryland sedges. As the canopy closes, there remain only such shade-tolerant forage plants as beaked panicum, low panicums, longleaf uniola, and dryland sedges, along with the woody plants.

WOODLAND SUITABILITY GROUP 16

This group consists only of Gravel pits, a land type that is made up chiefly of gravelly sandy clay loam. These pits are moderately productive for wood crops and are better suited to pines than to other trees. The

soil-related management problems are moderate and are caused by the high gravel content and the slope.

When the gravel has been removed and the pits have been abandoned, organic matter and plant nutrients are lacking. A new plant succession starts with annual grasses and weeds, which are followed by a combination of three-awn and starved panicum. Long-lived perennial grasses and forbs take over only after a surface layer has begun to develop. Eventually, the stand consists mainly of little bluestem, indiangrass, low panicums, beaked panicum, longleaf uniola, perennial three-awn, purple lovegrass, and sedges. After the canopy closes, the forage consists mostly of such shade-tolerant plants as beaked panicum, low panicums, longleaf uniola, and sedges, along with the woody plants. Little bluestem survives in small amounts.

WOODLAND SUITABILITY GROUP 17

This group consists of moderately well drained, slowly permeable soils. The surface layer is silt loam, and the subsoil is silty clay loam to silt loam.

These soils are moderately productive of pine. Loblolly pine generally is preferred for planting because its early growth is faster than that of other pines and the needle cast is heavier. The soil-related management problems are severe and are caused by erodibility and the heavy clay in the lower part of the subsoil.

Among the woody plants in the understory vegetation are hawthorn, wild grape, dogwood, muscadine, and bush huckleberry. The major forage plants are little bluestem, big bluestem, indiangrass, perennial three-awn, beaked panicum, low panicums, purpletop, longleaf uniola, skeletongrass, purple lovegrass, and dryland sedges. As the canopy closes, only shade-tolerant plants, such as beaked panicum, low panicums, longleaf uniola, and dryland sedges persist, along with the brushy plants.

WOODLAND SUITABILITY GROUP 18

This group is made up chiefly of prairie soils that are not suited to trees of commercial value. The soils are in poor tilth, are droughty, and contain large amounts of sodium and magnesium salts.

Where the root zone is several inches thick above the salty layer, the vegetation consists of native grasses and broadleafed forbs. Switchgrass, Florida paspalum, longspike tridens, purple silkyscale, low panicums, and spike sedge make excellent growth, but most of these plants have been overgrazed and only small amounts remain. Large areas are now covered with annual three-awn, large-leaf ragweed, poorjo, pricklypear, and annual weeds.

Wildlife [4]

Most of the soils in Cleveland County provide suitable habitats for one or more species of wildlife, and most are suitable for ponds that can be stocked with fish.

Bobwhite, deer, mourning dove, rabbit, squirrel, turkey, and nongame birds are common throughout the county. The narrow bottom lands along streams are well suited to wild ducks. The game fish most suitable for stocking ponds are bluegill, redear, bass, and channel catfish.

Following are brief summaries of the habitat needs of the principal kinds of wildlife in the county. Table 5 lists the plants that provide food and cover for the birds and animals and rates each kind of plant as choice, fair, or unimportant as a source of food for each species.

Bobwhite.—Choice foods for bobwhites are beechnuts, blackberries, browntop millet, black cherries, corn, cowpeas, croton, dogwood berries, annual lespedeza, bicolor lespedeza, mulberries, acorns, pecans, pine seeds, ragweed, grain sorghum, soybeans, and tickclover. Bobwhites feed near cover that protects them from predators. On excessively cold or hot days, bobwhites normally stay in or near cover. They obtain water from dew and succulent plants, and they readily eat insects, especially when nesting.

Deer.—Choice foods for deer include bahiagrass, blueberries, crimson clover, white clover, corn, cowpeas, greenbriers, honeysuckle, bicolor lespedeza, acorns, oats, rye, ryegrass, saw-palmetto, grain sorghum, and soybeans. Deer find abundant woodland cover throughout most of this county. They require a well-distributed water supply.

Dove, mourning.—Choice foods for doves are browntop millet, corn, croton, Japanese millet, pine seeds, ragweed, grain sorghum, and sweetgum seeds. Doves eat only seeds, and they drink water daily.

Duck.—Choice foods for ducks are beechnuts, browntop millet, corn, Japanese millet, acorns, smartweed, grain sorghum, and soybeans. Ducks prefer foods that grow in shallow water, but they occasionally eat acorns, corn, and soybeans on dry land.

Rabbit.—Choice foods for rabbits are clovers, grasses, and other succulent plants, which generally are available in sufficient quantities. For cover, rabbits need brier patches, plum thickets, and brush piles.

Squirrel—The squirrel population fluctuates according to the availability of such food plants as beechnuts, blackgum, black cherry, corn, baldcypress, dogwood, elm, hickory, magnolia, mulberry, oak, pine, grain sorghum, and tupelo. Acorns are a particularly important food. Mature woods with plenty of den trees are the best habitat for squirrels.

Turkey.—Choice foods for turkeys are bahiagrass, beechnuts, blackberries, blueberries, browntop millet, clovers, corn, cowpeas, dogwood berries, wild grapes, hackberries, acorns, pine seeds, and winter grains. Turkeys, the wildest of our game birds, require extensive woodland. They drink water daily, and they normally roost in large trees near or over water.

Nongame birds.—Most nongame birds eat a variety of insects, seeds, and fruits, but some eat nothing but insects and others eat only acorns, nut meats, and berries.

Fish.—Choice foods for bluegill, redear, small bass, and small channel catfish are aquatic worms, insects, and insect larvae. The larger bass and catfish feed chiefly on small fish. The amount of food produced is related directly to the fertility of the water, of the soils in the watershed, and of the soils at the bottom of the pond. Most ponds need to be fertilized if they are to produce enough food for fish.

[4] ROY GRIZZELL, JR., biologist, Soil Conservation Service, helped prepare this section.

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TABLE 5.—*Suitability of plants as food for wildlife*

[The figure 1 indicates that the plant is *choice* (attractive and nutritious) for the given kind of wildlife; the figure 2, *fair* (eaten when choice foods are not available); the figure 3, *unimportant* (eaten only in small amounts)]

Plant	Part of plant eaten	Bob-white	Deer	Dove	Duck	Rabbit	Squirrel	Turkey	Nongame birds [1]		
									Fruit eaters	Grain and seed eaters	Nut and acorn eaters
Bahiagrass	Forage	3	1	3	3	3	3	3	3	3	3
	Seed	3	2	2	3	3	3	1	3	2	3
Baldcypress	Seed	3	3	3	3	3	1	3	3	3	3
Beech	Nut	1	2	1	1	3	1	1	3	3	1
Blackberry	Fruit	1	3	3	3	3	2	1	1	3	3
Blackgum	Fruit	2	3	3	3	3	1	2	2	3	2
Blueberry	Fruit	2	1	3	3	3	3	1	1	3	3
Browntop millet	Seed	1	3	1	1	3	3	1	3	1	3
Cherry, black	Fruit	1	3	3	3	3	1	2	1	3	2
Chinkapin	Nut	3	2	3	3	3	1	3	3	3	1
Clover, crimson	Forage	2	1	3	3	1	3	1	3	3	3
Clover, white	Forage	2	1	3	3	1	3	1	3	3	3
Corn	Seed	1	1	1	1	1	1	1	3	1	3
Cowpeas	Seed	1	1	2	3	2	3	1	3	3	3
Croton	Seed	1	3	1	3	3	3	3	3	1	3
Dogwood, flowering	Fruit	1	3	3	3	3	1	1	1	3	3
Elm	Seed	3	3	3	3	3	1	2	3	3	3
Fescue	Forage	3	2	3	3	3	3	3	3	3	3
Grapes, wild	Fruit	3	3	3	3	3	2	1	3	3	3
Greenbrier	Forage	3	1	3	3	1	3	3	3	3	3
Hackberry	Fruit	2	3	3	3	3	2	1	1	3	3
Hickory	Nut	3	3	3	3	3	1	3	3	3	3
Holly, American	Fruit	3	3	3	3	3	3	3	1	3	3
Honeysuckle	Forage	3	1	3	3	1	3	3	3	3	3
	Fruit	3	3	3	3	3	3	2	1	3	3
Japanese millet	Seed	2	3	1	1	3	3	2	3	1	3
Lespedeza, annual	Forage	3	1	3	3	2	3	3	3	3	3
	Seed	1	3	3	3	3	3	2	3	3	3
Lespedeza, bicolor	Forage	3	1	3	3	2	3	3	3	3	3
	Seed	1	3	3	3	3	3	3	3	3	3
Magnolia	Fruit	3	3	3	3	3	1	2	1	3	3
Mulberry	Fruit	1	2	3	3	3	1	2	1	3	3
Oak	Acorn	1	1	3	1	3	1	1	3	3	1
Oats	Forage	3	1	3	3	1	3	1	3	3	3
Pecan	Nut	1	2	3	3	3	1	1	3	3	1
Pine	Seed	1	3	1	3	3	1	1	3	1	1
Ragweed, common	Seed	1	3	1	3	3	3	3	3	1	3
Rye	Forage	3	1	3	3	1	3	1	3	3	3
Ryegrass	Forage	3	1	3	3	1	3	1	3	3	3
Saw-palmetto	Forage	3	1	3	3	3	3	3	3	3	3
Smartweed	Seed	2	3	3	1	3	3	3	3	3	3
Sorghum, grain [2]	Seed	1	1	1	1	1	1	1	3	1	3
Soybeans	Forage	3	1	3	3	1	3	3	3	3	3
	Seed	1	3	2	1	3	3	1	3	3	3
Sweetgum	Seed	1	3	1	3	3	2	2	3	1	3
Tickclover (beggarlice)	Seed	1	3	3	3	3	3	2	3	3	3
Tupelo	Fruit	3	3	3	3	3	1	3	1	3	3
Waxmyrtle	Fruit	2	3	3	3	3	3	2	3	3	2

[1] Among the fruit eaters are bluebirds, catbirds, mockingbirds, and waxwings; grain and seed eaters include blackbirds, cardinals, meadowlarks, sparrows, and towhees; nut and acorn eaters include chickadees, bluejays, titmice, and woodpeckers.

[2] Flocking birds, such as blackbirds and sparrows, compete with the game birds and song birds for sorghum.

Wildlife suitability groups

The soils in Cleveland County have been placed in five wildlife suitability groups. (See the "Guide to Mapping Units" near the back of the survey.) The grouping is based on similar suitability for the plants that provide food and cover for wildlife. Most of the plants that are rated in table 5 for suitability as food for the important kinds of wildlife are rated in table 6 according to their suitability for growth on the soils in each wildlife group.

WILDLIFE SUITABILITY GROUP 1

This group consists of poorly drained to well-drained soils on bottom lands and of poorly drained soils on terraces. These soils occur along drainageways, on wide, low flats, and in depressions. They range from silt loam

TABLE 6.—*Suitability of plants to soils, by wildlife suitability groups*

[The figure 1 indicates that the plant is suited to the soils in the given group; the figure 2, that it is marginally suited; the figure 3, that it is poorly suited or not suited]

Plant	Wildlife suitability group				
	1	2	3	4	5
Bahiagrass	2	1	1	2	3
Baldcypress	1	3	3	3	3
Beech	1	3	3	3	3
Blackberry	1	1	1	1	2
Blackgum	1	2	2	2	2
Blueberry	3	2	2	1	3
Browntop millet	3	2	1	1	2
Cherry, black	3	1	1	1	2
Chinkapin	3	3	1	3	3
Clover, crimson	3	2	2	2	3
Clover, white	2	2	1	2	3
Corn	3	1	1	2	3
Cowpeas	2	1	1	2	3
Dogwood, flowering	3	1	1	1	2
Elm	1	2	2	2	2
Grapes, wild	1	1	1	1	2
Greenbrier	1	1	2	1	2
Hackberry	1	3	3	3	3
Hickory	1	1	1	1	2
Holly, American	1	3	3	2	3
Honeysuckle	3	1	1	1	3
Japanese millet	1	3	3	3	3
Lespedeza, annual	2	1	1	1	2
Lespedeza, bicolor	3	2	1	2	3
Magnolia	1	3	3	3	3
Mulberry	1	2	2	2	3
Oak, upland [1]	3	1	1	1	1
Oak, lowland [2]	1	3	3	2	3
Oats	2	1	1	3	2
Pecan	1	1	1	1	2
Pine	2	1	1	1	1
Ragweed, common	3	1	1	1	2
Rye	2	1	1	3	2
Ryegrass	2	1	1	3	2
Saw-palmetto	2	3	3	2	3
Smartweed	1	3	3	2	3
Sorghum, grain [3]	2	2	1	2	2
Soybeans	2	2	1	2	2
Sweetgum	1	1	1	1	2
Tickclover	3	1	1	1	2
Tupelo	1	3	3	3	3
Waxmyrtle	2	3	3	1	3

[1] Black oak, blackjack oak, post oak, Shumard oak, southern red oak, and white oak.

[2] Cherrybark oak, overcup oak, swamp chesnut oak, willow oak, and water oak.

[3] Grain sorghum deteriorates rapidly in this humid climate and attracts sparrows, blackbirds, and other unwanted birds.

to sandy loam in texture. Water covers most of the bottom land for long periods during winter and spring. It covers the terraces only for short periods during extremely high floods. This group makes up about 45 percent of the county.

Because of the overflow hazard, the choice of wildlife food plants on the bottom land is limited to such plants as blackgum, baldcypress, Japanese millet, oak, smartweed, soft maple, sweetbay magnolia, and tupelo. On the terraces, the range of plants includes loblolly pine and shortleaf pine.

Low dikes can be constructed in most areas of these soils to flood duck fields. A large acreage is suitable for deer and turkey. Waterholes are needed in some locations to supply water in summer and fall. Wildlife cover is plentiful.

WILDLIFE SUITABILITY GROUP 2

This group consists of moderately well drained and somewhat poorly drained soils that have a slope range of 0 to 20 percent. The surface layer ranges from silt loam to fine sandy loam. The subsoil is moderately to slowly permeable silty clay loam, sandy clay loam, or clay. This group makes up about 18 percent of the county.

About 85 percent of the acreage in this group is in woodland consisting of mixed pines and upland hardwoods. The soils are well suited to many of the choice food plants for wildlife. They are also suitable for ponds, which are needed to provide water in dry periods during summer and fall for deer, turkeys, squirrels, and quail. Wildlife cover is plentiful.

WILDLIFE SUITABILITY GROUP 3

This group consists of well drained and moderately well drained soils. The slope range is 1 to 21 percent, but a range of 3 to 12 percent is most common. These soils have a sandy loam surface layer. The group makes up about 22 percent of the county.

A large part of this group is cultivated. The soils are suited to most of the choice food plants for several species of wildlife, and the plants are fairly easy to establish and maintain. There are a number of favorable pond sites None of the soils are suited to flooding for duck fields. Wildlife cover is plentiful.

WILDLIFE SUITABILITY GROUP 4

This group consists of somewhat poorly drained soils that have a slope range of 0 to 8 percent. The surface layer is mottled gray and brown silt loam to very fine sandy loam. The subsoil is mottled gray and brown silt loam to light silty clay loam. The water table fluctuates from near the surface during winter and spring to a depth of 3 feet or more during dry periods in summer and fall. All the soils are droughty during dry periods. This group makes up about 12 percent of the county.

Most of the acreage in this group is in woodland consisting of mixed pines and hardwoods. The soils are fairly well suited to wildlife plant foods, but the selection is limited because of periods of wetness and droughtiness. A few small areas are suited to flooding for duck fields. There are adequate sites for small ponds, which are needed to supply water for deer, turkeys, squirrels, and quail. Wildlife cover is adequate.

WILDLIFE SUITABILITY GROUP 5

This group consists of poorly drained and somewhat poorly drained soils that have a slope range of 0 to 25 percent. The surface layer ranges from silty clay to very fine sandy loam in texture. The subsoil is compact, plastic silty clay loam or clay. These soils have slow internal drainage. They are very droughty in dry periods, which generally occur in summer and fall. The natural fertility is low. Tilth is poor. The soils of this

group are scattered throughout the county and make up about 3 percent of the total acreage.

Most of the soils in this group are wooded. They provide adequate cover for wildlife but a limited choice of food. Many drainageways are suitable sites for ponds. Small areas near the Saline River have only a sparse cover of three-awn and annual lespedeza and a scattering of small pines, post oaks, and haws. These areas are of little value for wildlife.

Engineering Uses of the Soils [5]

Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, facilities for storing water, erosion control structures, drainage systems, and sewage disposal systems. The soil properties most important to the engineer are available water capacity, permeability, shear strength, consolidation characteristics, texture, plasticity, shrink-swell potential, and reaction. Topography and the depth to unconsolidated material are also important.

The information in this survey can be used to—

1. Make soil and land use studies that will aid in selecting and developing industrial, municipal, business, residential, and recreational sites.
2. Make preliminary estimates of soil properties for use in the planning of agricultural drainage systems, farm ponds, earthen dams, irrigation systems, terraces, waterways, and diversion terraces.
3. Make preliminary evaluations of soil conditions that will aid in selecting locations for highways and airports and in planning detailed investigations of selected locations.
4. Locate probable sources of gravel and sand suitable for use as structural material.
5. Correlate performance of engineering structures with types of soil and thus develop information that will be useful in designing and maintaining structures.
6. Determine the suitability of soils for cross-country movement of vehicles and construction equipment.
7. Supplement information obtained from other published maps, reports, and aerial photographs.
8. Develop preliminary estimates for construction purposes pertinent to a particular area.
9. Develop working schedules for construction.
10. Appraise areas that have potential engineering uses.

With the use of the soil map for identification, the engineering interpretations in this subsection can be useful for many purposes. It should be emphasized that they may not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads and excavations deeper than the depths of layers here reported. Even in these situations, the soil map is useful for planning more detailed field investigations and for suggesting the kinds of problems that may be expected.

Some terms used by soil scientists may be unfamiliar to engineers, and other terms may have a special meaning in soil science. These terms are defined in the Glossary at the end of the survey.

Engineering classification systems

Two systems for classifying soils are in general use among engineers. Both are used in this survey. They are explained in the following paragraphs and in the PCA Soil Primer (*5*).

Most highway engineers classify soils according to the system approved by the American Association of State Highway Officials (AASHO) (*1*). This system of classification is based on the grain-size gradation, the liquid limit, the plasticity index, and the field performance of soils in highways. Soil materials are classified in seven principal groups. The groups range from A–1, which consists of gravelly soils of high bearing capacity (the best soils for subgrade), to A–7, which consists of clay soils having low strength when wet (the poorest soils for subgrade). Within each group, the relative engineering value of the soil material is indicated by a group index number. Group indexes range from 0 for the best material to 20 for the poorest. The group index is shown in parentheses following the soil group symbol, for example A–6(9).

Some engineers prefer to use the Unified soil classification system established by the Corps of Engineers, U.S. Army (*18*). In this system the soils are identified according to texture and plasticity and are grouped according to their performance as engineering construction materials. Soils are identified as coarse grained (eight classes), fine grained (six classes), and highly organic.

Engineering test data

To help evaluate the soils for engineering purposes, samples from seven profiles representing five of the principal soil series in Cleveland County were tested in accordance with standard procedures. Only selected layers of each soil were sampled. The results of these tests are presented in table 7.

The engineering classifications in table 7 are based on data obtained by grain-size analysis and by tests to determine the liquid limit and the plastic limit.

The tests for liquid limit and plastic limit measure the effect of water on the consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a semisolid to a plastic state. As the moisture content is further increased, the material changes from a plastic to a liquid state. The *plastic limit* is the moisture content at which the material passes from a semisolid to a plastic state. It is expressed as a percentage of the oven-dry weight of the soil. The *liquid limit* is the moisture content at which the material passes from a plastic to a liquid state. The *plasticity index* is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which the soil material is in a plastic state. Some silty and sandy

[5] This section was prepared with the assistance of WILLIAM E. ARNOLD, agricultural engineer, Soil Conservation Service. It includes information and recommendations from the Arkansas State Highway Department, the U.S. Army Corps of Engineers, and the U.S. Bureau of Public Roads.

soils are nonplastic, that is, they do not become plastic at any moisture content.

Table 7 also gives moisture-density data for the tested soils. If a soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material will increase until the optimum moisture content is reached. After that, the density decreases as the moisture content increases. The highest dry density obtained in the compaction test is termed *maximum dry density*, and the corresponding moisture content is the *optimum moisture*. Moisture-density data are important in earthwork, for, as a rule, soil is most stable if it is compacted to about the maximum dry density at approximately the optimum moisture content.

Engineering properties and interpretations

Table 8 shows estimates of some of the physical properties of soils that affect engineering work. The data are based on laboratory tests, on field experience with the same kinds of soils in other counties, and on information in other parts of this survey. Gravel pits is excluded from the table.

The rates of permeability are based on the movement of water through the soils in their undisturbed state. These rates depend largely on the texture and structure of the soils.

Available water capacity is approximately the amount of capillary water in the soil at field capacity. When the soil is at the wilting point of common crops, this amount of water will wet the soil material described to a depth of 1 inch without deeper percolation.

Reaction, which indicates the degree of acidity or alkalinity of the soils, is expressed in pH values.

Dispersion refers to the degree and speed with which soil structure breaks down, or slakes, in water. High dispersion means that the soil aggregates slake readily.

Shrink-swell potential indicates the volume change to be expected when the soil material changes in moisture content. In general, soils classed as CH and A-7 have high shrink-swell potential. Clean sand and most other nonplastic soil materials have low shrink-swell potential.

Table 9 gives the suitability of the soils for certain engineering uses and shows soil features and limitations that affect construction of highways and other engineering structures. Gravel pits is excluded from the table.

Some soils have physical characteristics that make highway construction difficult. The Amagon, Angie, Boswell, Falkner, Tippah, and Susquehanna soils have clay layers that shrink as they dry and swell as they become wet. These soils are therefore not suitable for use as subgrade material. Most of the soils in this county have a sandy to gravelly surface layer and a clay to sandy clay loam subsoil. The clay materials have a high shrink-swell potential and are not suitable for fill unless given special treatment. Bedrock is no problem in this county, because it is at a depth of at least 100 feet.

Topsoil is needed to maintain vegetation for control of erosion on embankments, road shoulders, ditches, and cut slopes. Sand and gravel clean enough for use as concrete aggregate occur in commercial quantity only in the Saffell soils and in the alluvial deposits on the bottoms along the Saline River. The Cahaba, Nacogdoches, Ruston, and Saffell soils have gravelly strata. These strata are possible sources of material for the subbase and base courses of pavements and for surfacing county roads. Because these strata normally contain clay, however, they are not suitable for use in concrete structures or for the surface course of a flexible pavement.

The ratings given for suitability for winter grading were made on the basis of soil drainage and the workability of the soil material when it is wet.

The Hatchie, Pheba, Prentiss, Stough, and Savannah soils have a compact layer, or fragipan, in the profile. This layer impedes drainage and causes a perched water table to form. The effect of the fragipan should be considered before a roadway is built across these soils. The Amagon, Angie, Boswell, Falkner, Lafe, Susquehanna, and Tippah soils have a very plastic subsoil, which also impedes drainage.

If the erosion hazard is moderate to severe, cultivated areas should be protected by vegetation, waterways, diversions, contour cultivation, and a terrace system.

The ratings in the column "Hydrologic soil group" are based on the entire soil profile to the depth shown in the column "Depth from surface" in table 8. The soils in the county are placed in four groups on the basis of their intake of water at the end of a long-duration storm, after prior wetting and swelling and without the protection of vegetation. Group A consists of deep sands that contain very little silt and clay. These soils soak up the most rain and have the least runoff. Group B contains mostly sandy soils that are less deep than the soils in group A. Soils in this group absorb more water than average, even after they are thoroughly wet. Group C consists of soils that contain large amounts of clay and colloidal particles, though lesser amounts than soils in Group D. Group C soils absorb less water than average after being thoroughly wet. Group D consists mostly of clays that increase greatly in volume when they absorb water, but partly of shallow soils that have nearly impermeable layers near the surface. Soils in group D soak up the least rain and lose the most as runoff.

A large part of this county is underlain by clay or gravelly clay that has a tendency to slough and slide when it is wet. The shrink-swell potential is high, and the coefficient of internal friction is low. Soils that have a clay subsoil are a hazard in heavy construction and in the transportation of heavy equipment during wet periods.

Farm ponds in this county are generally constructed by building an earthen embankment across a natural drainageway or by digging a pit. These ponds collect water and store it for livestock, irrigation, recreation, and other farm uses, but not for human consumption. The surface area of these ponds ranges from three-fourths of an acre to more than 20 acres.

Agricultural drainage in this county is not a serious problem, because there is enough slope to maintain runoff.

More rain falls in winter and spring than in summer and fall. Irrigation is needed in some periods during the growing season. Generally, only small areas used for truck crops are irrigated, because the water supply is inadequate, the topography is unfavorable, and fertility is low. Both sprinkler irrigation and furrow irrigation are used; ponds supply the water.

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TABLE 7.—*Engineering*

[Tests performed by the Arkansas State Highway Department in cooperation with U.S. Department of Commerce, Bureau

Soil name and location	Parent material	Arkansas report No. S–62–Ark–13–	Depth	Horizon
			In.	
Nacogdoches gravelly loam:				
SE¼NE¼ sec. 21, T. 10 S., R. 11 W. (Modal)	Sand, silt, clay, and gravelly material of forested Coastal Plain.	7–3	8 to 14	B21t
		7–5	25 to 41	B23t
		7–6	41 to 72	IIC
Saffell gravelly fine sandy loam:				
NE¼NE¼ sec. 27, T. 9 S., R. 11 W. (Modal)	Sand, silt, clay, and gravelly material of forested Coastal Plain.	4–3	7 to 36	B2t
		4–4	36 to 65	C
Shubuta fine sandy loam:				
SW¼SW¼ sec. 33, T. 11 S., R. 10 W. (Modal)	Sand, silt, and clay of forested Coastal Plain.	5–2	2 to 7	A2
		5–4	14 to 25	B22t
		5–5	25 to 60	B3
SW¼NE¼ sec. 30, T. 11 S., R. 10 W. (Nonmodal)	Sand, silt, and clay of forested Coastal Plain.	2–1	9 to 18	B21t
		2–2	18 to 24	B22t
		2–3	24 to 40	B23
		2–4	40 to 60	B3
Susquehanna silty clay:				
NW¼NW¼ sec. 14, T. 11 S., R. 11 W. (Modal)	Silt, clay, and soft clay shale of forested Coastal Plain.	6–2	3 to 10	B21t
		6–4	20 to 72	B23
Tippah silt loam:				
SW¼SE¼ sec. 29, T. 8 S., R. 10 W. (Modal)	Sand, silt, and clay of forested Coastal Plain.	3–4	10 to 17	B21t
		3–7	32 to 62	IIB24t
NW¼NE¼ sec. 21, T. 10 S., R. 9 W. (Nonmodal)	Sand, silt, and clay of forested Coastal Plain.	1–1	8 to 18	B21t
		1–2	18 to 29	B22t
		1–3	29 to 45	IIB23t

[1] Based on AASHO Designation: T 99–57, Method C (*1*).

[2] Mechanical analyses according to AASHO Designation: T 88–57 (*1*). Results by this procedure frequently differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in

The need for terraces and diversions in this county is determined mainly by the erodibility of the soils and the runoff potential.

Clay soils are a considerable hazard in the construction of foundations for multiple-story buildings.

Sewage disposal fields can be developed, unless drainage is inhibited by slow or very slow permeability or by a high water table.

Clay mineralogy of selected soils and the effects on engineering uses [6]

Many kinds of clay occur in soils, and their properties may vary widely. The presence of clay, even in fairly small amounts, is important in soil engineering because clay influences the retention and movement of water and, consequently, the stability of soils as foundation material. The mineralogical composition of clay in soils, the particle-size distribution, the variation in depth in the soil profile, the arrangement within the soil matrix, and the chemical environment provide information useful in predicting the performance of soils as engineering material. Studies of such properties provide an understanding of the fundamental causes of soil behavior. Also, they may disclose some unusual property of a soil that is important in engineering and that may not be disclosed by ordinary tests.

Duplicate samples of Tippah, Saffell, Shubuta, Susquehanna, and Nacogdoches soils, which are extensive in Cleveland County, were collected and tested by chemical analysis [7], X-ray diffraction (*4*), and differential ther-

[6] This section was written by M. E. HORN, associate professor, and W. R. COSTON, graduate assistant, University of Arkansas, Agricultural Experiment Station, in cooperation with the Arkansas State Highway Department and Department of Commerce, Bureau of Public Roads. The opinions, findings, and conclusions expressed in this section are those of the authors and not necessarily those of the Bureau of Public Roads.

[7] JACKSON, M. L. SOIL CHEMICAL ANALYSIS—ADVANCED COURSE. 991 pp., illus, 1956.

test data

of Public Roads, according to standard procedures of the American Association of State Highway Officials (AASHO)]

Moisture-density data [1]		Mechanical analysis [2]					Liquid limit	Plasticity index	Classification	
		Percentage passing sieve—								
Maximum dry density	Optimum moisture	3/8-in	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)			AASHO	Unified [3]
Lb. per cu. ft.	*Pct.*									
106	22	100	96	87	76	53	49	17	A–7–5(7)	ML.
97	27	100	96	91	86	67	55	16	A–7–5(11)	MH.
99	25	100	98	96	94	66	46	13	A–7–5(8)	ML.
131	8	100	84	69	55	33	23	8	A–2–4(0)	SC.
130	8	[4] 98	65	42	20	10	31	13	A–2–6(0)	SW–SC.
118	12	100	97	91	88	31	[5] NP	[5] NP	A–2–4(0)	SM.
96	26	100	99	99	98	50	51	17	A–7–5(7)	SM.
105	20	----------	100	99	99	53	45	18	A–7–6(7)	ML–CL.
94	25	----------	----------	100	99	72	56	27	A–7–6(17)	MH–CH.
97	23	----------	100	99	99	68	52	20	A–7–5(13)	MH.
103	20	----------	----------	----------	100	64	48	21	A–7–6(11)	ML–CL.
105	20	----------	----------	----------	100	65	42	17	A–7–6(9)	ML–CL.
105	19	100	99	98	92	87	39	17	A–6(11)	CL.
98	25	100	99	98	96	90	63	32	A–7–5(20)	MH–CH.
111	17	100	99	96	90	74	34	13	A–6(9)	CL.
97	24	100	98	97	94	85	59	31	A–7–6(20)	CH.
112	16	100	99	98	92	70	36	20	A–6(11)	CL.
113	15	100	99	98	92	68	34	15	A–6(9)	CL.
106	19	[4] 99	99	98	94	71	49	29	A–7–6(17)	CL.

diameter is excluded from calculations of grain-size fractions. The mechanical analysis data in this table are not suitable for use in naming textural classes for soils.

[3] Soil Conservation Service and Bureau of Public Roads have agreed to consider that all soils having plasticity indexes within 2 points of the A-line are to be given a borderline classification. Examples of borderline classifications obtained by this use are ML–CL and MH–CH.

[4] One hundred percent passed the 3/4-inch sieve.

[5] NP = Nonplastic.

mal analytical techniques (*3*). The results of this analysis provide the basis for the clay mineralogy data presented in table 10.

These data show that the mineralogical composition of the tested soils is similar. The five soils studied are all highly weathered, as indicated by the predominance of quartz in the fine silt fraction and of resistant secondary clay minerals and amorphous materials in the clay fractions. The coarse clays are chiefly kaolinite and partly a mixture of montmorillonite, quartz, illite, and vermiculite. The medium clays contain large quantities of kaolinite, montmorillonite, or amorphous materials. The amorphous materials, which appear to be most abundant in the upper horizons, are composed of iron compounds, free silica, and free alumina. Normally, only small amounts of illite, vermiculite, or chlorite occur in medium clays. The fine clays appear to be mainly montmorillonite and amorphous materials. In several of the fine clays, especially those of the Nacogdoches soil, differential thermal analysis disclosed the presence of small amounts of gibbsite not detected by X-ray diffraction.

Some properties of the five soils studied in Cleveland County are summarized in the following paragraphs. Also, there is a brief discussion of the relationship between the clay mineralogy and the engineering properties of each soil.

Nacogdoches gravelly loam.—Nacogdoches soils differ significantly from the other soils in Cleveland County because of their high content of iron oxides. Most oxides and associated hydrated forms of iron are of clay size and, if present in appreciable amounts, are important to the physical behavior of a soil. Since they are nonexpanding and relatively inert chemically, they do not contribute greatly to the volume changes brought about by variations in moisture or chemical environment. Generally, Nacogdoches soils are not so plastic as soils that have a comparable clay content and a lower content of iron oxides.

TABLE 8.—*Estimated physical*

Soil series and map symbols	Depth from surface	Classification		
		USDA texture	Unified	AASHO
	Inches			
Amagon (AmB, AmC).	0 to 36	Silt loam	CL	A–4 or A–6
	36 to 60	Silty clay loam to clay	CH or MH	A–7
Angie (AnA, AnB).	0 to 5	Silt loam	CL	A–6
	5 to 50	Silty clay	CL	A–6 or A–7–6
Boswell (BoB2, BoC2, BoE2).	0 to 6	Loam	ML–CL	A–4
	6 to 15	Clay loam	CL	A–6 or A–7
	15 to 50	Silty clay or clay	CL or CH	A–7
Bowie (BwB, BwC).	0 to 12	Fine sandy loam	SM	A–2
	12 to 60	Fine sandy loam	SM or ML	A–4
Caddo (CaA, CaB).	0 to 20	Silt loam	ML–CL	A–4
	20 to 56	Silt loam	CL	A–6
Cahaba (CbC2).	0 to 12	Fine sandy loam	ML or SM	A–4
	12 to 44	Silty clay loam to clay loam	CL or SC	A–6 or A–7
	44 to 56	Fine sandy loam	SM–SC or SC	A–2
Collins (Co).	0 to 21	Silt loam or loam	ML–CL	A–4
	21 to 60	Silt loam	ML–CL	A–4
Falaya (Fa).	0 to 9	Silt loam	ML	A–4
	9 to 56	Silt loam	ML	A–4
Falkner (FkA, FkB2).	0 to 14	Silt loam	ML	A–4
	14 to 28	Silt loam to clay loam	CL	A–6
	28 to 50	Clay	CL or CH	A–7
Hatchie (HaB).	0 to 7	Silt loam	ML	A–4
	7 to 22	Silt loam	ML–CL	A–4
	22 to 42	Silt loam	ML–CL	A–4 or A–6
	42 to 60	Silt loam	CL	A–4 or A–6
Lafe (La).	0 to 6	Silt loam	ML	A–4
	6 to 32	Silt loam	ML–CL	A–4 or A–6
	32 to 70	Clay loam to loam	CL	A–6
Nacogdoches (NaC2).	0 to 8	Gravelly loam	ML or SM	A–4
	8 to 25	Sandy loam to clay loam	MH	A–7
	25 to 72	Clay loam to clay	ML or MH	A–7
Ochlockonee (Oc, Ow).	0 to 10	Very fine sandy loam or loam	SM, SC, or CL	A–4
(For Wehadkee part of Ow, see Wehadkee series)	10 to 42	Loam	ML or CL	A–4
	42 to 60	Loam	ML or CL	A–4 or A–6
Pheba (PeA, PeB).	0 to 11	Very fine sandy loam to silt loam.	ML	A–4
	11 to 18	Silt loam	ML	A–4
	18 to 32	Silt loam	ML	A–4
	32 to 60	Silt loam or loam	ML–CL	A–4
Prentiss (PrB, PrC).	0 to 10	Very fine sandy loam to silt loam.	ML	A–4
	10 to 26	Silt loam	ML–CL	A–4
	26 to 48	Silt loam	ML	A–4
	48 to 62	Silt loam to clay loam	CL	A–6 or A–7–6
Ruston (RuC, RuC2).	0 to 7	Fine sandy loam or sandy loam	SM	A–2 or A–4
	7 to 32	Sandy loam to loam	CL	A–4 or A–6
	32 to 60	Sandy loam	SM	A–2
Saffell (SaC, SaE).	0 to 7	Fine sandy loam to sandy loam	SC or CL	A–4
	7 to 36	Sandy loam	SM–SC or SC	A–4 or A–2
	36 to 65	Sandy loam	SW–SC or SC	A–2 or A–1

properties of soils

Percentage passing sieve—			Permeability	Available water capacity	Reaction	Dispersion	Shrink-swell potential
No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)					
			Inches per hour	*Inches per inch of soil depth*	*pH*		
100	95 to 100	75 to 90	0. 2 to 0. 8	0. 21	4. 0 to 5. 5	High	Moderate.
100	95 to 100	80 to 100	<0. 05	. 16	4. 0 to 5. 5	Low	High.
95 to 100	90 to 100	85 to 95	0. 2 to 2. 5	. 21	4. 5 to 5. 5	Moderate to high	Moderate to low.
95 to 100	90 to 100	80 to 90	<0. 05	. 16	4. 0 to 5. 0	Moderate to high	High.
95 to 100	85 to 95	60 to 70	0. 2 to 5. 0	. 16	4. 5 to 5. 5	High	Low.
95 to 100	90 to 100	75 to 85	<0. 05	. 16	4. 5 to 5. 0	Low	High.
95 to 100	90 to 100	75 to 90	<0. 05	. 16	4. 5 to 5. 0	Moderate	High.
100	90 to 100	15 to 30	2. 5 to 5. 0	. 14	4. 5 to 5. 5	High	Low.
100	95 to 100	35 to 60	2. 5 to 5. 0	. 14	4. 5 to 5. 5	High	Low.
100	90 to 100	70 to 80	0. 2 to 0. 8	. 21	4. 0 to 4. 5	High	Low.
100	90 to 100	75 to 85	0. 2 to 0. 8	. 21	5. 0 to 5. 5	Moderate to high	Moderate.
100	95 to 100	45 to 65	2. 5 to 5. 0	. 14	5. 0 to 6. 0	Moderate to high	Low.
100	95 to 100	45 to 70	0. 8 to 2. 5	. 20	4. 5 to 5. 5	Moderate	Moderate.
100	100	25 to 35	2. 5 to 5. 0	. 14	4. 5 to 5. 5	High	Low.
100	95 to 100	50 to 65	0. 2 to 0. 8	. 21	4. 5 to 5. 5	Low to moderate	Low.
100	95 to 100	60 to 70	0. 05 to 0. 2	. 21	4. 5 to 5. 5	Moderate to high	Low.
100	95 to 100	60 to 80	0. 2 to 0. 8	. 21	4. 5 to 5. 5	High	Low.
100	95 to 100	50 to 70	0. 2 to 0. 8	. 21	4. 5 to 5. 5	High	Low.
100	90 to 100	65 to 80	0. 2 to 2. 5	. 21	4. 5 to 5. 5	High	Low.
100	90 to 100	75 to 85	0. 2 to 0. 8	. 20	4. 5 to 5. 5	Low	Moderate.
100	90 to 100	75 to 90	0. 05 to 0. 2	. 16	4. 5 to 5. 5	Low	High.
100	90 to 100	70 to 80	0. 2 to 0. 8	. 21	4. 5 to 5. 5	High	Low.
100	90 to 100	70 to 80	0. 2 to 0. 8	. 21	4. 5 to 5. 5	High	Low.
100	90 to 100	70 to 80	0. 05 to 0. 2	. 21	4. 5 to 5. 5	Low to moderate	Low.
100	95 to 100	70 to 80	0. 05 to 0. 2	. 21	4. 5 to 5. 5	Moderate to high	Low.
100	95 to 100	65 to 85	0. 8 to 2. 5	. 21	4. 5 to 6. 0	High	Low.
100	95 to 100	80 to 90	0. 05 to 0. 2	. 21	6. 0 to 8. 0	High	Moderate.
100	95 to 100	70 to 90	0. 05 to 0. 2	. 16	8. 0 to 9. 0	Moderate to low	Moderate.
75 to 95	70 to 80	40 to 60	2. 0 to 5. 0	. 08	5. 0 to 6. 0	High	Low.
75 to 95	80 to 90	60 to 75	0. 8 to 2. 0	. 16	5. 0 to 6. 0	Moderate	Moderate.
75 to 100	85 to 95	60 to 70	0. 05 to 0. 2	. 16	4. 5 to 5. 5	Low	High.
100	95 to 100	45 to 60	0. 8 to 2. 5	. 16	4. 5 to 5. 5	High	Low.
100	95 to 100	75 to 90	0. 2 to 0. 8	. 16	4. 5 to 5. 5	Moderate	Low.
100	95 to 100	60 to 80	0. 2 to 0. 8	. 16	4. 5 to 5. 5	Moderate	Low.
100	95 to 100	55 to 75	0. 2 to 0. 8	. 16	4. 5 to 5. 5	High	Low.
100	95 to 100	60 to 80	0. 05 to 0. 2	. 21	4. 0 to 5. 0	Low	Low.
100	95 to 100	60 to 80	0. 05 to 0. 2	. 21	4. 0 to 5. 0	Low	Low.
100	95 to 100	65 to 85	0. 02 to 0. 8	. 21	4. 0 to 5. 0	Moderate to low	Low.
100	90 to 100	50 to 70	0. 8 to 2. 5	. 20	4. 5 to 5. 5	High	Low.
100	90 to 100	60 to 80	0. 2 to 0. 8	. 21	4. 5 to 5. 5	High	Low.
100	90 to 100	65 to 85	0. 05 to 0. 2	. 21	4. 5 to 5. 5	Moderate to low	Low.
100	90 to 100	75 to 90	0. 2 to 0. 8	. 21	5. 0 to 6. 0	Moderate to low	Low to moderate.
95 to 100	60 to 100	30 to 45	2. 5 to 5. 0	. 14	4. 0 to 5. 0	High	Low.
95 to 100	70 to 100	50 to 70	0. 8 to 2. 5	. 14	4. 5 to 5. 5	Moderate to high	Low.
95 to 100	40 to 100	25 to 35	2. 5 to 5. 0	. 14	4. 5 to 5. 5	Moderate to high	Low.
60 to 80	50 to 70	45 to 55	2. 5 to 5. 0	. 06	4. 5 to 5. 5	High	Low.
65 to 85	50 to 70	30 to 50	0. 8 to 2. 5	. 06	4. 5 to 6. 0	High	Low.
35 to 65	15 to 35	10 to 30	5. 0 to 10. 0	. 06	4. 5 to 5. 5	High	Low.

TABLE 8.—*Estimated physical*

Soil series and map symbols	Depth from surface	Classification		
		USDA texture	Unified	AASHO
	Inches			
Savannah (ShB, ShC, ShD2).	1 to 6	Very fine sandy loam or fine sandy loam.	ML	A–4
	6 to 22	Loam	CL	A–4 or A–6
	22 to 50	Loam	CL	A–4 or A–6
Shubuta (SmC, SmC2, SmD, SnC2, SnE).	0 to 7	Fine sandy loam to loamy fine sand.	SM	A–2 or A–4
	7 to 25	Clay to sandy clay	SM or MH	A–7
	25 to 60	Sandy clay loam	CL–ML	A–7
Stough (StB, StC).	0 to 7	Silt loam	ML	A–4
	7 to 17	Silt loam	ML	A–4
	17 to 42	Silt loam	ML	A–4
	42 to 60	Silt loam	ML–CL	A–4
Susquehanna:				
Very fine sandy loam (SvA, SvB2, SvC2, SvE).	0 to 5	Very fine sandy loam or loam	CL	A–6
	5 to 35	Clay	MH–CH	A–7
	35 to 60	Silty clay	MH–CH	A–7
Silty clay (SuA, SuB).	0 to 3	Silt loam to silty clay	CL	A–7 or A–6
	3 to 20	Silty clay	CH or MH	A–7
	20 to 72	Silty clay	CH or MH	A–7
Tippah (TaA, TaB2, TaC2, TaC3, TaE).	0 to 10	Silt loam	CL	A–6
	10 to 32	Silt loam or loam	CL	A–6
	32 to 62	Silty clay	CL or CH	A–7
Wehadkee (Wa, Wb, Wc, Wf). (Properties were not estimated for Local alluvium part of Wb, because they are too variable. For Caddo part of Wc, see Caddo series; for Falaya part of Wf, see Falaya series).	0 to 6	Silt loam	ML–CL	A–4
	6 to 24	Silt loam	CL	A–4 or A–6
	24 to 54	Loam	CL	A–6
Weston (WsA, WsB).	0 to 40	Sandy loam to silt loam	ML	A–4
	40 to 54	Loam	CL	A–4 or A–6

The AASHO classification of the B21t, B23t, and IIC horizons of this profile and the group index ratings (see table 7, p. 36) are supported by the data in table 10.

Saffell gravelly fine sandy loam.—The significance of the mineralogical composition of the clay fraction of a coarse-textured soil, such as Saffell gravelly fine sandy loam, is largely related to the properties of the binder material (the material passing the No. 200 sieve). In the two Saffell samples studied, the binder material is predominantly quartz in the silt and very fine sand fractions and kaolinite in the clay fractions. These materials are essentially nonplastic and hold little moisture.

The samples of the Saffell soil differ mainly in that the C horizon contains slightly more clay than the B2t horizon. This difference in clay content apparently causes differences in the properties of the two horizons. For example, the B2t horizon has a liquid limit of 23, a plasticity index of 8, and an AASHO classification of A–2–4(0). The C horizon has a liquid limit of 31, a plasticity index of 13, and a classification of A–2–6(0) (see table 7, p. 36). It is difficult to see, however, how such a minor increase in clay content would cause so much effect on the Atterberg limits. An explanation may lie in the kinds of clay present in the two horizons, but data on the composition of the clay in the B2t horizon are not available. The close agreement in chemical data obtained from samples of the two horizons suggests that there are similar kinds of clays present.

Shubuta fine sandy loam.—The data obtained for the A2 horizon of Shubuta fine sandy loam support the engineering test determination of "nonplastic" for this material. The A2 horizon is less than 3 percent clay, and the clay is predominantly kaolinite.

A comparison of the data for the B22t and the B3 horizons of this soil provides a striking example of how the kind of clay may outweigh the total clay present as an influence on the engineering properties of a soil. The B22t horizon is 42.9 percent clay; the B3 horizon is 33.7 percent clay. These percentages were obtained by the

properties of soils—Continued

Percentage passing sieve—			Permeability	Available water capacity	Reaction	Dispersion	Shrink-swell potential
No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)					
			Inches per hour	*Inches per inch of soil depth*	*pH*		
95 to 100	90 to 100	50 to 70	0. 8 to 2. 5	0. 20	5. 5 to 6. 5	High	Low.
95 to 100	90 to 100	60 to 80	0. 8 to 2. 5	. 16	4. 5 to 5. 5	Moderate	Low.
95 to 100	90 to 100	60 to 80	0. 05 to 0. 2	. 16	4. 5 to 5. 5	Low	Low.
95 to 100	90 to 100	25 to 50	2. 5 to 5. 0	. 14	5. 0 to 6. 0	High	Low.
100	95 to 100	45 to 70	0. 5 to 0. 2	. 16	5. 0 to 6. 0	Low	Moderate to high.
100	95 to 100	50 to 70	0. 5 to 0. 2	. 16	4. 5 to 5. 5	Low to moderate	Moderate to high.
100	95 to 100	60 to 80	0. 8 to 2. 5	. 21	4. 0 to 5. 0	High	Low.
100	95 to 100	70 to 90	0. 05 to 0. 2	. 21	4. 5 to 5. 5	High	Low.
100	95 to 100	70 to 90	0. 05 to 0. 2	. 21	4. 5 to 5. 5	Moderate to low	Low.
100	95 to 100	75 to 95	0. 05 to 0. 2	. 21	4. 5 to 5. 5	High	Low.
98 to 100	90 to 100	55 to 75	0. 8 to 2. 5	. 20	4. 5 to 5. 5	High	Low.
98 to 100	95 to 100	80 to 90	<0. 05	. 16	4. 0 to 5. 0	Moderate to high	High.
98 to 100	95 to 100	80 to 95	<0. 05	. 16	4. 0 to 5. 0	Moderate to high	High.
95 to 100	90 to 100	80 to 90	0. 05 to 0. 2	. 16	4. 5 to 5. 5	Moderate to high	Moderate to high.
100	90 to 100	85 to 100	<0. 05	. 20	4. 5 to 5. 5	Moderate	High.
100	95 to 100	90 to 100	<0. 05	. 16	4. 5 to 5. 5	Moderate to low	High.
95 to 100	90 to 100	60 to 80	0. 8 to 2. 5	. 21	4. 5 to 6. 0	High	Low.
95 to 100	90 to 100	65 to 90	0. 2 to 0. 8	. 21	4. 0 to 5. 0	Moderate to low	Moderate.
95 to 100	90 to 100	70 to 95	<0. 05	. 16	4. 0 to 5. 0	Moderate to low	High.
100	95 to 100	65 to 75	0. 2 to 0. 8	. 21	4. 5 to 5. 0	High	Low.
100	98 to 100	65 to 75	0. 2 to 0. 8	. 21	4. 5 to 5. 5	Moderate	Low.
100	95 to 100	65 to 75	0. 05 to 0. 2	. 16	5. 0 to 6. 0	Moderate	Moderate.
100	95 to 100	50 to 64	0. 2 to 0. 8	. 16	4. 0 to 5. 5	High	Low.
100	95 to 100	60 to 70	0. 2 to 0. 8	. 16	4. 5 to 5. 5	Moderate to low	Low.

hydrometer method (*2*). The clay-mineral data, however, show that the amount of montmorillonite is appreciably greater in the B3 horizon than in the B22t horizon. Thus, despite a lesser amount of clay in the B3 horizon the AASHO classification for this horizon, on the basis of engineering tests, was determined to be A–7–6(7), as compared to A–7–5(7) for the B22t horizon (see table 7, p. 36). The greater plasticity and susceptibility to volume change indicated by the AASHO classification is clearly related to the montmorillonite content.

Susquehanna silty clay.—Of the five soils studied, this soil is probably the least desirable as an engineering material because of the high content of clay and silt. Coarse clays of the B21t, B22t, and B23 horizons are predominantly kaolinite, although montmorillonite is also abundant. In the fine and medium clays, montmorillonite is dominant in the B22t and B23 horizons and amorphous materials are more abundant in the medium clay of the B21t horizon. Engineering tests of samples from these three horizons have revealed the same difference. The classification is A–6(11) for the B21t horizon, as compared to A–7–5(20) for the B23 horizon (see table 7, p. 36). This difference indicates that the amorphous materials, despite their colloidal size, are less effective in water retention than the montmorillonite clays.

Tippah silt loam.—The two samples of Tippah silt loam are separated by a lithologic discontinuity; that is, the upper part of the profile formed in sediments unlike those occurring in the lower part. This discontinuity is indicated by a pronounced increase in clay content and by a shift in clay dominance from kaolinite and amorphous material in the B21t horizon to montmorillonite in the IIB24t horizon. These distinguishing properties of the two horizons explain the differences in the liquid limit and the plasticity index and, in turn, lead to an AASHO classification of A–6(9) for the upper horizon and A–7–6(20) for the lower horizon (see table 7, p. 36). A–7–6 soils are subject to extremely high volume change. In the IIB24t horizon, analysis by X-ray diffraction

TABLE 9.—*Engineering*

Soil series and map symbols	Suitability of soil material for —		Suitability as source of—		Suitability for winter grading	Desirable location of grade line	Erosion hazard	Hydrologic soil group
	Road subgrade	Road fill	Topsoil	Sand and gravel				
Amagon (AmB, AmC)	Poor	Poor	Poor	Poor	Poor because of poor drainage.	Anywhere if drainage is adequate.	Slight to severe.	D
Angie (AnA, AnB)	Poor	Poor	Poor	Poor	Poor because of somewhat poor drainage.	4 feet above seasonal high water table or high water mark.	Slight to moderate.	D
Boswell (BoB2, BoC2, BoE2).	Poor	Poor	Surface layer good; other layers poor.	Poor	Poor because of plastic clay subsoil.	Anywhere if drainage is adequate.	Moderate to very severe.	D
Bowie (BwB, BwC)	Good	Good	Good	Poor	Good because of good drainage.	Anywhere	Moderate	B
Caddo (CaA, CaB)	Poor	Poor	Poor	Poor	Poor because of high water table.	4 feet above seasonal high water table.	Slight	C
Cahaba (CbC2)	Good	Good	Good	Medium locally in substratum.	Good because of good drainage.	Anywhere	Moderate	B
Collins (Co)	Good	Surface layer good; other layers poor.	Surface layer good; other layers poor.	Poor	Fair because of occasional floods.	4 feet above high water mark.	Slight	B
Falaya (Fa)	Poor	Surface layer good; other layers poor.	Surface layer good; other layers poor.	Poor	Fair because of frequent floods and high water table.	4 feet above high water mark.	Slight	C
Falkner (FkA, FkB2)	Poor	Fair to depth of 24 inches.	Surface layer good; other layers poor.	Poor	Fair because of somewhat poor drainage.	4 feet above seasonal high water table.	Slight	C

interpretations

Tendency to slough or slide	Soil features affecting use of the soil for—						
	Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Building foundations	Sewage disposal
	Kind	Hazard					
High	Impounded	Erodibility	Generally not needed, because of slope; slow permeability.	Cost high compared to benefits.	Erodibility because of plastic clay subsoil.	Plastic clay with high shrink-swell potential.	Slow percolation rate.
High	Impounded	Slow permeability; high erodibility.	Seasonal high water table.	Favorable available water capacity; slow infiltration rate.	Not needed, because of flat topography.	High water table; clay subsoil with high shrink-swell potential.	High water table; slow percolation rate.
High	Impounded	Slow permeability; high erodibility.	Not needed, because of sloping topography.	Shallow over clay; requires frequent applications.	High erodibility; high runoff potential.	Plastic clay subsoil with high shrink-swell potential.	Slow percolation rate.
Low	Impounded	Local areas contain sand in substratum.	Not needed, because of good natural drainage.	Favorable available water capacity; favorable infiltration rate.	Erodibility	Stable, well-graded material.	Rapid percolation rate.
Moderate	Excavated	None	Seasonal high water table; flat topography; slow permeability.	Cost high compared to benefits.	Not needed, because of flat topography.	High water table.	High water table; slow percolation rate.
Low	Impounded	Local areas contain sand in substratum.	Not needed, because of good natural drainage.	Favorable available water capacity; favorable infiltration rate.	Erodibility	Stable, well-graded material.	Rapid percolation rate.
Moderate	Excavated	None	Not needed, because of fair natural drainage.	Favorable available water capacity; favorable infiltration rate.	Not needed, because of flat topography	High water table.	Occasional floods.
Moderate	Excavated	None	High water table; frequent floods; slow permeability.	Favorable available water capacity; slow infiltration rate; infrequent irrigation needed.	Not needed, because of flat topography.	High water table; frequent floods.	High water table; floods.
High	Impounded	Slow permeability; high erodibility.	Seasonal high water table; flat topography; slow permeability.	Shallow over clay; requires frequent applications.	High erodibility; high runoff potential.	Clay subsoil with high shrink-swell potential.	Slow percolation rate.

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TABLE 9.—*Engineering*

Soil series and map symbols	Suitability of soil material for—		Suitability as source of—		Suitability for winter grading	Desirable location of grade line	Erosion hazard	Hydrologic soil group
	Road subgrade	Road fill	Topsoil	Sand and gravel				
Hatchie (HaB)	Poor	Poor	Poor	Poor	Poor because of somewhat poor drainage.	4 feet above seasonal high water table.	Slight	C
Lafe (La)	Poor	Poor	Poor	Poor	Poor because of somewhat poor or poor drainage.	4 feet above seasonal high water table.	Severe	D
Nacogdoches (NaC2)	Good	Good	Surface layer fair; other layers poor.	Fair	Good because of good drainage.	Anywhere	Moderate	C
Ochlockonee (Oc, Ow) (For Wehadkee part of Ow, see Wehadkee series).	Good	Good	Good	Poor	Fair because of occasional floods.	4 feet above high water mark.	Slight	B
Pheba (PeA, PeB)	Poor	Poor	Poor	Poor	Poor because of somewhat poor drainage.	4 feet above seasonal high water table.	Slight	C
Prentiss (PrB, PrC)	Good	Good	Surface layer good; other layers fair.	Poor	Good because of moderately good drainage.	4 feet above seasonal high water table.	Moderate	C
Ruston (RuC, RuC2)	Good	Good	Good	Medium locally; good in substratum.	Good because of good drainage.	Anywhere	Moderate	B
Saffell (SaC, SaE)	Good	Good	Poor	Good	Good because of good drainage.	Anywhere	Moderate to very severe.	B
Savannah (ShB, ShC, ShD2).	Good	Good	Surface layer good; other layers fair.	Poor	Good because of moderately good drainage.	4 feet above seasonal high water table.	Moderate to severe.	C

interpretations—Continued

Tendency to slough or slide	Soil features affecting use of the soil for—						
	Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Building foundations	Sewage disposal
	Kind	Hazard					
Moderate	Impounded	Erodibility; fragipan in subsoil.	Seasonal high water table.	Cost high compared to benefits.	Not needed, because of flat topography.	High water table.	High water table; moderate to slow percolation rate.
High	None	Erodibility	Slow permeability; flat topography.	Cost high compared to benefits.	Not needed, because of flat topography.	Plastic clay subsoil; loose sand in substrata.	Slow percolation rate.
Moderate	Impounded	None	Not needed, because of good natural drainage.	Favorable available water capacity; favorable infiltration rate.	Erodibility	Stable; high content of gravel.	Moderate percolation rate.
Low	Excavated	None	Not needed, because of good natural drainage.	Favorable available water capacity; favorable infiltration rate.	Not needed, because of flat topography.	High water table.	Occasional floods.
Moderate	Impounded	Erodibility; fragipan in subsoil.	Seasonal high water table.	Cost high compared to benefits.	Not needed, because of flat topography.	High water table.	High water table; moderate to slow percolation rate.
Moderate	Impounded	Erodibility; fragipan in subsoil.	Not needed, because of sloping topography.	Favorable available water capacity; favorable infiltration rate above the fragipan.	Erodibility	Stable, moderately well drained material.	Moderate percolation rate.
Low	Impounded	Local areas contain sand in substratum.	Not needed, because of good natural drainage.	Favorable available water capacity; favorable infiltration rate.	Erodibility	Stable, well-graded material.	Rapid percolation rate.
Low	None	High gravel content.	Not needed, because of good natural drainage.	Cost high compared to benefits; low available water capacity; rapid infiltration rate.	Erodibility	Stable, well-graded material.	Rapid percolation rate.
Moderate	Impounded	Erodibility; fragipan in subsoil.	Not needed, because of sloping topography.	Favorable available water capacity; favorable infiltration rate above the fragipan.	Erodibility	Stable, moderately well drained material.	Moderate percolation rate.

TABLE 9.—*Engineering*

Soil series and map symbols	Suitability of soil material for—		Suitability as source of—		Suitability for winter grading	Desirable location of grade line	Erosion hazard	Hydrologic soil group
	Road subgrade	Road fill	Topsoil	Sand and gravel				
Shubuta (SmC, SmC2, SmD, SnC2, SnE).	Fair	Fair	Fair	Poor	Good because of moderately good drainage.	4 feet above seasonal high water table.	Moderate to very severe.	C
Stough (StB, StC)	Poor	Poor	Poor	Poor	Poor because of somewhat poor drainage.	4 feet above seasonal high water table.	Slight to moderate.	C
Susquehanna (SuA, SuB, SvA, SvB2, SvC2, SvE).	Poor	Poor	Poor	Poor	Poor because of somewhat poor drainage.	Anywhere if drainage is adequate.	Slight to very severe.	D
Tippah (TaA, TaB2, TaC2, TaC3, TaE).	Poor	Poor	Poor	Poor	Good because of moderately good drainage.	Anywhere if drainage is adequate.	Slight to very severe.	D
Wehadkee (Wa, Wb, Wc, Wf). (Interpretations were not made for Local alluvium part of Wb, because the properties are variable. For Caddo part of Wc, see Caddo series; for Falaya part of Wf, see Falaya series)	Poor	Poor	Poor	Poor	Poor because of frequent floods and high water table.	4 feet above seasonal high water table.	Slight	D
Weston (WsA, WsB)	Poor	Poor	Poor	Poor	Poor because of high water table.	4 feet above seasonal high water table.	Slight to moderate.	C

shows that a high content of montmorillonite is present in the coarse and medium clay fractions and is responsible for this extremely high volume change potential. A high cation-exchange capacity and prominent differential thermal analysis peaks for montmorillonite support the conclusion that montmorillonite is the dominant constituent in the clays of the IIB24t horizon. For use as subgrade, this material would be rated very poor (group index 20).

Genesis, Morphology, and Classification of the Soils

This section discusses the factors of soil formation, the classification of the soils in Cleveland County by higher categories, and the morphology of the soils. In the last part, each soil series is discussed briefly and a representative profile of each is described in detail.

interpretations—Continued

Tendency to slough or slide	Soil features affecting use of the soil for—						
	Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Building foundations	Sewage disposal
	Kind	Hazard					
High	Impounded	None	Not needed because of sloping topography.	Somewhat favorable available water capacity; favorable infiltration rate.	Erodibility	Deep to clay in substratum.	Moderate percolation rate.
Moderate	Impounded	Erodibility; fragipan in subsoil.	Seasonal high water table.	Cost high compared to benefits.	Not needed, because of flat topography.	High water table.	High water table; moderate to slow percolation rate.
High	Impounded	Erodibility	Generally not needed, because of slope; permeability.	Cost high compared to benefits.	Erodibility because of plastic clay subsoil.	Plastic clay with high shrink-swell potential.	Slow percolation rate.
High	Impounded	Slow permeability; high erodibility.	Generally not needed because of sloping topography.	Cost high compared to benefits.	Erodibility	Clay subsoil with high shrink-swell potential.	Slow percolation rate.
Moderate	Excavated	None	Seasonal high water table; flat topography; slow permeability.	Cost high compared to benefits.	Not needed, because of flat topography.	High water table; frequent floods.	High water table; frequent floods.
Moderate	Excavated	None	Seasonal high water table; slow permeability.	Cost high compared to benefits.	Not needed because of flat or nearly level topography.	High water table.	High water table; slow percolation rate.

Formation of Soils

Soil is formed by the interaction of climate, parent material, living organisms, and topography over a period of time. The characteristics of a soil reflect the relative importance of each factor. For example, Susquehanna and Ruston soils formed on the same kind of topography and under the same kind of vegetation, but they differ in several properties because Susquehanna soils formed from clayey parent material and Ruston soils formed from sandy parent material. Stough and Pheba soils have similar profiles because of similarity in parent material, relief, and vegetation. The relative importance of the five factors varies from place to place, and in some places one factor is dominant and determines most of the soil properties.

TABLE 10.—*Mineralogy of*

[Dashed lines mean

Soil	Sample No. S–62–Ark–13–	Horizon	Depth from surface	Fine silt (5–2 microns)		Coarse clay (2–0.2 microns)	
				Percentage of sample	Mineralogy	Percentage of sample	Mineralogy
			Inches				
Nacogdoches gravelly loam.	7–3	B21t	8 to 14	0. 33	95 percent quartz, 2 percent illite, 2 percent kaolinite, 1 percent vermiculite.	18. 80	65 percent kaolinite, 15 percent vermiculite, 10 percent illite, 9 percent montmorillonite, less than 1 percent quartz, less than 1 percent chlorite.
	7–5	B23t	25 to 41	1. 27	85 percent quartz, 10 percent kaolinite, 4 percent illite, 1 percent vermiculite.	29. 74	85 percent kaolinite, 9 percent montmorillonite, 5 percent illite, less than 1 percent quartz, less than 1 percent vermiculite.
	7–6	IIC	41 to 72	2. 27	85 percent quartz, 10 percent illite, 4 percent kaolinite, 1 percent vermiculite.	26. 11	90 percent kaolinite, 5 percent montmorillonite, 4 percent illite, 1 percent quartz.
Saffell gravelly fine sandy loam.	4–3	B2t	7 to 36	2. 23	90 percent quartz, 5 percent illite, 2 percent kaolinite, 2 percent potash feldspars, 1 percent vermiculite.	3. 00	----------
	4–4	C	36 to 65	. 66	95 percent quartz, 4 percent illite, less than 1 percent potash feldspars, less than 1 percent plagioclase feldspars.	3. 19	90 percent kaolinite, 5 percent vermiculite, 4 percent illite, less than 1 percent quartz, less than 1 percent montmorillonite.
Shubuta fine sandy loam.	5–2	A2	2 to 7	1. 25	95 percent quartz, 2 percent potash feldspars, 1 percent vermiculite, less than 1 percent kaolinite, less than 1 percent illite, less than 1 percent plagioclase feldspars.	2. 31	65 percent kaolinite, 15 percent vermiculite, 10 percent quartz, 5 percent illite, 5 percent montmorillonite.
	5–4	B22t	14 to 25	. 98	95 percent quartz, 3 percent kaolinite, 1 percent illite, less than 1 percent potash feldspars, less than 1 percent plagioclase feldspars.	16. 47	65 percent kaolinite, 25 percent montmorillonite, 7 percent quartz, 3 percent illite.
	5–5	B3	25 to 60	1. 46	80 percent quartz, 15 percent illite, 5 percent kaolinite.	18. 65	48 percent montmorillonite, 40 percent kaolinite, 11 percent illite, 1 percent quartz.
Susquehanna silty clay.	6–2	B21t	3 to 10	6. 19	90 percent quartz, 5 percent illite, 4 percent kaolinite, less than 1 percent potash feldspars, less than 1 percent plagioclase feldspars.	17. 96	65 percent kaolinite, 20 percent montmorillonite, 12 percent illite, 3 percent quartz.

See footnotes at end of table.

selected soils

absence of data]

Medium clay (0.2–0.08 micron)		Fine clay (less than 0.08 micron)		Total percentage of clay [1]	Calculated cation-exchange capacity of total clay	Percentage of free iron as Fe_2O_3
Percentage of sample	Mineralogy	Percentage of sample	Mineralogy			
					Meq./100 gm. soil	
7.65	44 percent amorphous materials, 41 percent kaolinite, 13 percent montmorillonite, 1 percent chlorite, 1 percent illite.	0.54	100 percent amorphous materials and montmorillonite.	27.0	38	10.7
7.90	53 percent amorphous materials, 30 percent kaolinite, 15 percent montmorillonite, 2 percent illite.	.46	100 percent amorphous materials and montmorillonite.	38.1	44	12.5
3.79	44 percent interstratified minerals (32, 28, and 24 Angstroms), random mixed minerals (10 and 14 Angstroms), and some intergradient chlorite-vermiculite; 30 percent montmorillonite; 20 percent kaolinite; 6 percent illite.	1.12	100 percent montmorillonite and amorphous materials.	31.0	45	8.9
8.21	----------	[2]	----------	11.2	49	----------
10.00	58 percent amorphous materials, 39 percent kaolinite, 3 percent illite.	[2]	----------	13.1	40	1.6
[2]	----------	[2]	----------	2.3	14	1.0
15.21	60 percent amorphous materials, 37 percent montmorillonite, 1 percent interstratified chlorite and montmorillonite, 1 percent interstratified montmorillonite and illite, 1 percent interstratified vermiculite and illite.	1.41	54 percent montmorillonite, 46 percent amorphous materials.	33.1	42	7.1
8.31	55 percent amorphous materials, 44 percent montmorillonite, 1 percent interstratified montmorillonite and illite.	3.75	74 percent montmorillonite, 26 percent amorphous materials.	30.7	51	4.5
8.40	64 percent amorphous materials, 35 percent montmorillonite, 1 percent interstratified montmorillonite and illite.	2.67	73 percent montmorillonite, 26 percent amorphous materials, 1 percent interstratified montmorillonite and illite.	29.0	53	3.4

TABLE 10.—*Mineralogy of*

Soil	Sample No. S–62–Ark–13–	Horizon	Depth from surface	Fine silt (5–2 microns)		Coarse clay (2–0.2 microns)	
				Percentage of sample	Mineralogy	Percentage of sample	Mineralogy
			Inches				
Susquehanna silty clay—Con.	6–3	B22t	10 to 20	5. 99	85 percent quartz, 10 percent illite, 4 percent kaolinite, less than 1 percent potash feldspars, less than 1 percent plagioclase feldspars.	17. 99	70 percent kaolinite, 20 percent montmorillonite, 7 percent illite, 3 percent quartz.
	6–4	B23	20 to 72	5. 42	90 percent quartz, 5 percent illite, 4 percent kaolinite, less than 1 percent potash feldspars, less than 1 percent plagioclase feldspars.	26. 29	80 percent kaolinite, 10 percent montmorillonite, 9 percent illite, 1 percent quartz.
Tippah silt loam	3–4	B21t	10 to 17	3. 16	90 percent quartz, 5 percent illite, 3 percent kaolinite, 1 percent vermiculite, less than 1 percent potash feldspars, less than 1 percent plagioclase feldspars.	12. 48	42 percent kaolinite, 15 percent quartz, 15 percent vermiculite, 13 percent illite, 10 percent montmorillonite, 5 percent interstratified chlorite and montmorillonite.
	3–7	IIB24t	32 to 62	3. 13	85 percent quartz, 8 percent illite, 5 percent kaolinite, 1 percent plagioclase feldspars less than 1 percent potash feldspars.	17. 93	65 percent montmorillonite, 30 percent kaolinite, 4 percent illite, 1 percent quartz.

[1] The sum of the individual clay fractions includes losses due to handling and to removal of free iron, salts, and some amorphous materials. These losses are offset, in part, by gains due to dispersion and attrition of the coarser particles and aggregates.
[2] Trace.

Climate

The climate in Cleveland County is one of warm summers, mild winters, and ample, well-distributed precipitation. The climate is uniform throughout the county, and consequently it does not account for significant differences among the soils.

Most of the soils on uplands and terraces are strongly weathered and strongly leached. Moderately high summer temperatures favor the activity of micro-organisms from about April 1 to November 1, and ample rainfall results in intense leaching of soluble and colloidal material from about the middle of November to the middle of June. Subzero temperatures are rare, and the soils are frozen for only short periods and to a depth of only a few inches; consequently, freezing and thawing have had little effect on weathering and soil formation.

Living organisms

Vegetation has had more influence than animal life on soil formation in this county. Pine and hardwood trees covered most of the soils on uplands and terraces. The most common species were loblolly pine, shortleaf pine, red oak, white oak, post oak, willow oak, water oak, hickory, sweetgum, blackgum, and ash. The bottom lands were covered with Nuttall oak, willow oak, swamp chestnut oak, cherrybark oak, hackberry, American elm, and green ash. The difference in native vegetation seems to be associated mainly with differences in drainage or in the frequency and duration of floods.

Parent material

Most of the soils in Cleveland County formed in sediments deposited in the Gulf of Mexico when the gulf extended northward to about the foot of the Ouachita Mountains. These sediments consisted mostly of noncalcareous sand, silt, and clay, and included some gravelly material. Hatchie, Falkner, and Tippah soils have a thin mantle of loess on the gulf sediments. The mantle ranges from less than 1 foot to more than 10 feet in thickness. The geological formations that are presently at the surface, with the exception of the loess, date from Tertiary, Pleistocene, and Recent times (*19*). Data about the sources of loess are not available, but it is assumed that the primary sources were the flood plains of the Mississippi River and the Arkansas River (*17*). Deposition probably occurred during and after the advances of the Wisconsin glaciers, the last of which moved into the Upper Mississippi River Valley about 11,000 years ago.

On the flood plains of the Saline River, Moro Creek, and their tributaries, the parent material consisted of

selected soils—Continued

Medium clay (0.2–0.08 micron)		Fine clay (less than 0.08 micron)		Total percentage of clay [1]	Calculated cation-exchange capacity of total clay	Percentage of free iron as Fe_2O_3
Percentage of sample	Mineralogy	Percentage of sample	Mineralogy			
6. 05	73 percent montmorillonite, 22 percent amorphous materials, 5 percent illite.	4. 58	80 percent montmorillonite, 20 percent amorphous materials.	28. 6	*Meq./100 gm. soil* 52	2. 3
16. 92	88 percent montmorillonite, 7 percent amorphous materials, 5 percent illite.	4. 88	90 percent montmorillonite, 10 percent amorphous materials.	48. 1	49	3. 5
5. 97	78 percent amorphous materials, 20 percent montmorillonite, 2 percent vermiculite.	(2)	62 percent amorphous materials, 38 percent montmorillonite.	18. 5	69	2. 2
16. 08	85 percent montmorillonite, 14 percent amorphous materials, 1 percent kaolinite.	6. 01	81 percent montmorillonite, 19 percent amorphous materials.	40. 0	77	1. 3

recent alluvium derived from the adjacent uplands and terraces.

Topography

Cleveland County occupies a smooth plain that slopes gently toward the southeast. Moro Creek, which forms the western boundary, is in a rather shallow, flat-bottomed valley in the most poorly drained part of the county. The other streams are not so shallow and sluggish as Moro Creek, but they all flow gently southeastward.

Adjacent to the major streams are long, narrow, poorly drained and somewhat poorly drained terraces. The slope rarely exceeds 2 percent, and the width and length of the terraces depend mainly on the size of the streams.

Between the main streams are belts of uplands that range from less than a mile to several miles in width. These uplands have been dissected into hills by erosion and are mostly well drained.

The elevation in this county ranges from 150 feet to 275 feet above sea level.

Time

The length of time required for a soil to form depends on the other factors of soil formation, and largely on climate and parent material. Less time generally is required for a soil to form in humid, warm regions that have luxuriant vegetation than in dry or cold regions that have scanty vegetation. Less time is required for a soil to form from coarse-textured parent material than from fine-textured material, other factors being equal. Generally, older soils show a greater degree of differentiation between horizons.

Most of the soils on the smoother parts of the uplands and on the older stream terraces in Cleveland County have matured. On some of the steeper slopes, geologic erosion has removed soil material too rapidly for mature profiles to develop.

Classification of the Soils

Soils are classified so that we can more easily remember their significant characteristics, assemble knowledge about them, see their relationship to one another and to the whole environment, and understand their behavior and their response to management. First through classification, and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

Two systems of classifying soils have been used in the United States in recent years. The older system was adop-

ted in 1938 (*10*) and revised later (*8*). The system currently used was adopted for general use by the National Cooperative Soil Survey in 1965.[8] The current system is under continual study. Therefore readers interested in developments of the system should search for the latest literature available (*6*).

The current system of classification defines classes in terms of observable or measurable properties of soils. It has six categories. Beginning with the most inclusive, the categories are the order, suborder, great group, subgroup, family, and series. The placement of some soil series in the current system, particularly in families, may change as more precise information becomes available.

[8] UNITED STATES DEPARTMENT OF AGRICULTURE. SOIL SURVEY STAFF, SCS. SOIL CLASSIFICATION, A COMPREHENSIVE SYSTEM, 7TH APPROXIMATION. 1960. [Supplement issued in March 1967.]

In table 11 the soils of Cleveland County are classified according to the current system and the 1938 system. Following are brief descriptions of each of the six categories in the current system.

ORDER.—Ten soil orders are recognized in the current system: Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The orders are primarily broad climatic groupings. Two exceptions are the Entisols and Histosols, which include soils in many different climates. Four of the orders are represented in Cleveland County—Entisols, Inceptisols, Alfisols, and Ultisols.

Entisols are recent soils in which there has been no horizon development. This order includes many, but not all, of the soils previously called Alluvial soils. It is repre-

TABLE 11.—*Soil series classified according to the current system of classification and the 1938 system*

Series	Current system			1938 system	
	Family	Subgroup	Order	Great soil group	Order
Amagon	Fine silty, mixed, thermic	Typic Ochraqualfs	Alfisols	Low-Humic Gley	Intrazonal.
Angie	Clayey, mixed, thermic	Aquic Paleudults	Ultisols	Red-Yellow Podzolic intergrading to Low-Humic Gley.	Zonal intergrading to intrazonal.
Boswell	Fine, montmorillonitic, thermic.	Vertic Paleudalfs	Alfisols	Red-Yellow Podzolic	Zonal.
Bowie	Fine loamy, siliceous, thermic.	Plinthic Paleudults	Ultisols	Red-Yellow Podzolic	Zonal.
Caddo	Fine silty, siliceous thermic.	Plinthic Ochraquults	Ultisols	Low-Humic Gley	Intrazonal.
Cahaba	Fine loamy, siliceous thermic.	Typic Hapludalfs	Alfisols	Red-Yellow Podzolic	Zonal.
Collins	Coarse silty, mixed, acid, thermic.	Aquic Udifluvents	Entisols	Alluvial	Azonal.
Falaya	Coarse silty, mixed, acid, thermic.	Aeric Fluventic Haplaquepts.	Inceptisols	Alluvial intergrading to Low-Humic Gley.	Azonal intergrading to intrazonal.
Falkner	Fine silty, mixed, thermic.	Aquultic Paleudalfs	Alfisols	Red-Yellow Podzolic	Zonal.
Hatchie	Fine silty, mixed, thermic.	Aqueptic Fragiudalfs	Alfisols	Planosols (with a fragipan).	Intrazonal.
Lafe	Fine silty, mixed, thermic.	Typic Natraqualfs	Alfisols	Solodized Solonetz	Intrazonal.
Nacogdoches	Clayey, halloysitic, thermic.	Typic Rhodudults	Ultisols	Reddish-Brown Lateritic	Zonal.
Ochlockonee	Coarse loamy, siliceous, acid, thermic.	Typic Udifluvents	Entisols	Alluvial	Azonal.
Pheba	Fine silty, mixed, thermic.	Aqueptic Fragiudults	Ultisols	Planosols (with a fragipan).	Intrazonal.
Prentiss	Coarse loamy, siliceous, thermic.	Typic Fragiudults	Ultisols	Red-Yellow Podzolic (with a fragipan).	Zonal.
Ruston	Fine loamy, siliceous, thermic.	Typic Paleudults	Ultisols	Red-Yellow Podzolic	Zonal.
Saffell	Loamy skeletal, siliceous, thermic.	Typic Hapludults	Ultisols	Red-Yellow Podzolic	Zonal.
Savannah	Fine loamy, mixed, thermic.	Typic Fragiudults	Ultisols	Red-Yellow Podzolic (with a fragipan).	Zonal.
Shubuta	Clayey, mixed, thermic	Typic Paleudults	Ultisols	Red-Yellow Podzolic	Zonal.
Stough	Coarse loamy, siliceous, thermic.	Aquic Fragiudults	Ultisols	Planosols (with a fragipan).	Intrazonal.
Susquehanna	Fine, montmorillonitic, thermic.	Vertic Paleudalfs	Alfisols	Red-Yellow Podzolic	Zonal.
Tippah	Fine silty over clayey, mixed, thermic.	Ultic Paleudalfs	Alfisols	Red-Yellow Podzolic	Zonal.
Wehadkee	Fine loamy, mixed, acid, thermic.	Fluventic Haplaquepts	Inceptisols	Low-Humic Gley	Intrazonal.
Weston	Coarse loamy, siliceous, thermic.	Typic Ochraquults	Ultisols	Low-Humic Gley	Intrazonal.

sented in Cleveland County by Collins and Ochlockonee soils.

Inceptisols occur mostly on young, but not recent, land surfaces. Their name is derived from the Latin word *inceptum*, for beginning. This order is represented by Falaya soils, which were formerly classified as Alluvial soils intergrading to Low-Humic Gley soils, and Wehadkee soils, which were formerly classified as Low-Humic Gley soils.

Alfisols contain accumulated aluminum and iron and have a high base saturation. This order is represented by Amagon soils, which were formerly classified as Low-Humic Gley soils; Boswell, Cahaba, Falkner, Susquehannah, and Tippah soils, formerly classified as Red-Yellow Podzolic soils; Hatchie soils, formerly classified as Planosols with a fragipan; and Lafe soils, formerly classified as Solodized Solonetz soils.

Ultisols are mineral soils that are restricted to humid climates. They are commonly on old land surfaces. If the parent materials are of late Pleistocene age, they were highly weathered before they were deposited. Ultisols are highly weathered and strongly developed, and they have a low base saturation. They were classified in the 1938 system as Red-Yellow Podzolic soils, Red-Yellow Podzolic soils with a fragipan, Planosols with a fragipan, Low-Humic Gley soils, and Reddish-Brown Lateritic soils.

Utisols are represented in this county by Angie, Bowie, Caddo, Nacogdoches, Pheba, Prentiss, Ruston, Saffell, Savannah, Shubuta, Stough, and Weston soils.

Suborder.—Each order is divided into suborders, primarily on the basis of those soil characteristics that seem to produce classes having the greatest genetic similarity. The suborders have a narrower climatic range than the orders. The soil properties used to separate suborders reflect mainly either the presence or absence of waterlogging or differences resulting from climate or vegetation.

Great Groups.—Each suborder is divided into great groups, which are based on uniformity in kind and sequence of the major soil horizons and features. The horizons considered in making these separations are those in which clay, iron, or humus has accumulated and those that have pans that interfere with the growth of roots or the movement of water. The features considered are the self-mulching properties of clays, soil temperature, major differences in chemical composition (mainly in calcium, magnesium, sodium, and potassium), and the like. (The great groups are not shown separately in table 11, because they are identified by the last word in the name of the subgroup.)

Subgroups.—Each great group is divided into subgroups, one representing the central (typic) segment of the group and others, called intergrades, that have properties of one great group and also one or more properties of another great group, suborder, or order. Subgroups may also be recognized in those instances where soil properties intergrade outside the range of any other great group, suborder, or order.

Families.—Families are established within a subgroup primarily on the basis of properties important to the growth of plants or the behavior of soils when they are used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence.

Series.—The series has the narrowest range of characteristics of the categories in the classification system. It is explained in the section "How This Soil Survey Was Made."

Morphology of the Soils

Most soil profiles contain three major horizons, A, B, and C. The A horizon is the surface layer. The B horizon is immediately beneath the A horizon. It has not developed in some of the younger soils. It contains the maximum accumulation of dissolved or suspended materials, such as iron or clay. The B horizon usually is firmer than the horizons immediately above and below it and is likely to have blocky structure. Beneath the B horizon is the C horizon. The C has been little affected by the soil-forming processes, but it can be materially modified by weathering.

Most of the soils in Cleveland County have well-defined horizons that have developed through one or more of the following processes: (1) accumulation of organic matter, (2) leaching of carbonates and salts more soluble than calcium carbonate, (3) translocation of silicate clay minerals, and (4) reduction and transfer of iron and manganese.

Enough organic matter has accumulated in the uppermost layer of all the soils in the county to form an A1 horizon. Ochlockonee and Collins soils, which are on bottom lands, generally have the largest amounts of organic matter. In most of the soils, the difference between the darker colored A1 horizon and the lighter colored A2 horizon is caused by the addition of organic matter to the A1 and the removal of organic matter, clay minerals, and iron oxides from the A2.

Leaching of carbonates and salts has occurred in all the soils and is an important factor in horizon development in most of the soils. The carbonates and salts are gone from all except Lafe soils, in which the content of basic elements is still high. Leaching has been least important in differentiating the horizons in Caddo, Amagon, Wehadkee, Ochlockonee, and Falaya soils.

The translocation of silicate clay minerals, or the downward movement of the clay minerals to a lower layer, or B horizon, in the soils, has been one of the chief factors in developing soil horizons in the county. Ruston, Boswell, and Susquehanna soils are good examples of this process.

The reduction and transfer of iron and manganese, also called gleying, has occurred, to some degree, in all the poorly drained and somewhat poorly drained soils. Evidence of gleying is clear in the naturally wet Wehadkee and Caddo soils. The gray colors in the deeper horizons of these wet soils indicate the reduction of iron oxides. In some soils, reduction is accompanied by the transfer of iron. In some places, the iron has been segregated within one or more horizons and has formed mottles of various shades of red, brown, and yellow. In others, most commonly in the somewhat poorly drained and poorly drained soils, the iron compounds have been segregated and formed into concretions.

Representative Soil Profiles

In the following pages each soil series in Cleveland County is discussed briefly, and a profile of a soil representative of the series is described. The colors given are for moist soils.

Amagon Series

The Amagon series consists of nearly level and gently sloping, poorly drained, medium acid to very strongly acid soils on uplands. The underlying material is made up of beds of unconsolidated sand, silt, and clay.

Amagon soils are associated with Susquehanna and Pheba soils. Their subsoil is coarser textured than that of Susquehanna soils and is gray instead of gray and red. Amagon soils have a finer textured subsoil than Pheba soils, which have a fragipan.

Profile of Amagon silt loam, heavy substratum, 0 to 3 percent slopes (AmB), in a moist wooded area in the NE¼SE¼ sec. 3, T. 9 S., R. 13 W.:

O2—¼ inch to 0, partly decomposed plant remains.
A1—0 to 2 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; abundant roots; common, fine, hard, dark-colored concretions; strongly acid; clear, smooth boundary.
A2—2 to 8 inches, gray (10YR 6/1) silt loam with few, fine, faint mottles of yellowish brown (10YR 5/4); moderate, medium, subangular blocky structure; friable; plentiful roots; few fine pores; few, fine, hard, dark-colored concretions; strongly acid; gradual, smooth boundary.
B11g—8 to 15 inches, gray (10YR 6/1) silt loam with common, fine, distinct mottles of yellowish brown (10YR 5/4); moderate, medium, subangular blocky structure; firm; plentiful roots; few fine pores; few, fine, hard, dark-colored concretions; very strongly acid; gradual, smooth boundary.
B12g—15 to 36 inches, gray (10YR 6/1) silt loam with many, fine and medium, prominent mottles of yellowish brown (10YR 5/8) and brownish yellow (10YR 6/6); moderate, medium and coarse, subangular blocky structure; slightly sticky; few fine roots; common fine pores; very strongly acid; clear, irregular boundary.
B2tg—36 to 43 inches, grayish-brown (10YR 5/2) silty clay loam with few, fine, faint mottles of pale brown (10YR 6/3); strong, coarse, angular blocky structure; very plastic; few fine pores; few, fine, soft, dark-colored concretions; continuous clay films; few fragments of ironstone up to 1 inch in diameter; a little chert gravel; few fragments of petrified wood; very strongly acid; abrupt, wavy boundary.
IIC1g—43 to 60 inches, pale-olive (5Y 6/3) clay; strong, medium, subangular blocky structure; plastic; very strongly acid; abrupt, wavy boundary.
IIIC2g—60 to 68 inches +, mottled gray (10YR 6/1) and yellowish-brown (10YR 5/8) clay loam; moderate, medium, angular blocky structure; friable; very strongly acid.

The A horizon ranges from 6 to 8 inches in thickness. The texture of the B12g horizon is silt loam to light silty clay loam. In many places the B2tg horizon contains fragments of petrified wood. The C horizon varies widely in color.

Angie Series

The Angie series consists of somewhat poorly drained, medium acid and strongly acid soils on stream terraces. The underlying material is old alluvium washed from Susquehanna, Boswell, and other soils of the upland.

Angie soils are associated mainly with Caddo and Prentiss soils. They are less gray than Caddo soils and have a finer textured subsoil. Angie soils are less brown and less well drained than Prentiss soils, have a finer textured subsoil, and lack the fragipan that is characteristic of those soils.

Profile of Angie silt loam, 0 to 1 percent slopes (AnA), in a moist wooded area in the SE¼SW¼ sec. 15, T. 11 S., R. 10 W.:

O1—¼ inch to 0, partly decomposed plant remains.
A1—0 to 4 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, subangular blocky structure; firm; plentiful roots; few, small, hard, dark-colored concretions; strongly acid; clear, smooth boundary.
B2t—4 to 18 inches, mottled strong-brown (7.5YR 5/8), gray (10YR 6/1), and yellowish-brown (10YR 5/6) silty clay loam; mottles are fine and medium; moderate, fine and medium, angular blocky structure; plastic; common clay films; plentiful fine roots; few, fine, hard, dark-colored concretions; a little chert gravel; very strongly acid; gradual, wavy boundary.
B3—18 to 30 inches, mottled red (2.5YR 4/8), gray (10YR 6/1), and yellowish-brown (10YR 5/8) silty clay loam; moderate, fine and medium, angular blocky structure; very plastic; a little chert gravel; very strongly acid; gradual, smooth boundary.
C—30 to 45 inches +, gray (10YR 6/1) silty clay or clay with common, fine and medium, distinct mottles of yellowish brown (10YR 5/8) and red (2.5YR 4/8); moderate, medium, angular blocky structure; very plastic; a little fine chert gravel; very strongly acid.

The A horizon ranges from dark gray to grayish brown in color. The B horizon is variegated red, gray, and brown silty clay loam, silty clay, or clay loam. The depth to the C horizon ranges from 25 to 36 inches.

Boswell Series

The Boswell series consists of nearly level to moderately steep, moderately well drained, acid soils on uplands. The underlying material is made up of beds of unconsolidated sand, silt, and clay.

Boswell soils are associated with Susquehanna, Shubuta, and Tippah soils. Boswell soils are better drained than Susquehanna soils and have a redder subsoil. They have a finer textured subsoil than Tippah and Shubuta soils.

Profile of Boswell loam, 1 to 3 percent slopes, eroded (BoB2), in a moist wooded area, formerly cultivated, in the SE¼SE¼ sec. 27, T. 9 S., R. 10 W.:

Ap—0 to 6 inches, dark-brown (7.5YR 4/4) loam; weak, fine, granular structure; friable; plentiful roots; a little chert gravel; few, fine, hard, dark-colored concretions; strongly acid; abrupt, smooth boundary.
B21t—6 to 15 inches, red (2.5YR 4/8) clay; moderate, medium, subangular blocky structure; plastic; shiny ped faces; plentiful roots; few fine pores; common chert gravel; very strongly acid; gradual, smooth boundary.
B22t—15 to 26 inches, mottled red (2.5YR 4/8), gray (10YR 6/1), and pale-brown (10YR 6/3) clay; moderate, coarse, subangular blocky structure; plastic; few fine roots; continuous clay films; a little chert gravel; very strongly acid; diffuse boundary.
C—26 to 50 inches +, gray (10YR 6/1) clay with many, fine to coarse, distinct mottles of red (2.5YR 4/8); massive; very plastic; continuous clay films; a little chert gravel up to ¼ inch in diameter; very strongly acid.

The Ap horizon ranges from dark gray or grayish brown to dark brown in color and from loam to gravelly

fine sandy loam in texture. The B21t horizon ranges from red to yellowish red in color and from 6 to 18 inches in thickness. In some places the B22t horizon is dominantly red.

Bowie Series

The Bowie series consists of nearly level and gently sloping, moderately well drained, medium acid soils on uplands. The underlying material is made up of beds of unconsolidated sand, silt, and clay.

Bowie soils are associated with Ruston and Savannah soils. They have a lighter colored subsoil than Ruston soils and are more prominently mottled in the lower part. The subsoil of Bowie soils is less brown than that of Savannah soils, which have a fragipan.

Profile of Bowie fine sandy loam, 3 to 8 percent slopes (BwC), in a moist wooded area, formerly cultivated, in the SE¼SE¼ sec. 10, T. 10 S., R. 12 W.:

Ap—0 to 7 inches, pale-brown (10YR 6/3) fine sandy loam; weak, fine, granular structure; very friable; abundant roots; few, fine, hard, dark-colored concretions; medium acid; clear, smooth boundary.

A2—7 to 12 inches, light yellowish-brown (10YR 6/4) fine sandy loam; weak, medium, subangular blocky structure; very friable; plentiful roots; few, fine, hard, dark-colored concretions; strongly acid; gradual, smooth boundary.

B1—12 to 17 inches, yellowish-brown (10YR 5/8) fine sandy loam; weak, medium, subangular blocky structure; friable; few fine roots; few fine pores; few, fine, hard, dark-colored concretions; very strongly acid; gradual, smooth boundary.

B21t—17 to 26 inches, yellowish-brown (10YR 5/8) light sandy clay loam; weak, fine and medium, angular and subangular blocky structure; slightly plastic; few fine roots; few fine pores; few, fine, hard, dark-colored concretions; very strongly acid; gradual, wavy boundary.

B22t—26 to 44 inches, yellowish-brown (10YR 5/4) sandy clay loam with many, fine and medium, distinct mottles of gray (10YR 6/1), brown (10YR 5/3), and red (2.5YR 5/8); moderate, medium, angular and subangular blocky structure; firm when moist, slightly plastic when wet; few fine pores; few fine roots; few, fine, hard, dark-colored concretions; very strongly acid; diffuse boundary.

C—44 to 60 inches +, mottled gray (10YR 6/1), brownish-yellow (10YR 6/6), and yellowish-brown (10YR 5/8) fine sandy loam with lenses of sandy clay loam and sand; moderate, medium, subangular blocky structure; friable; few, fine, dark-colored concretions; a little chert gravel; very strongly acid.

The A horizon ranges from dark grayish brown to yellowish brown in color and from 8 to 16 inches in thickness. The B1 horizon is yellowish brown to brownish yellow. The B21t horizon ranges from yellowish brown to brown in color and from fine sandy loam to sandy clay loam in texture. The B22t horizon is yellowish brown or light yellowish brown. The depth to mottling ranges from 25 to 40 inches.

Caddo Series

The Caddo series consists of level and nearly level, poorly drained, medium acid to very strongly acid soils. The underlying material is made up of beds of unconsolidated sand, silt, and silty clay.

Caddo soils are associated mainly with Savannah and Pheba soils. They are more poorly drained than those soils, which have a fragipan. Caddo soils are mottled throughout, whereas Savannah soils are free of mottles in the upper part.

Profile of Caddo silt loam, 0 to 1 percent slopes (CaA), in a moist wooded area in the NW¼NW¼ sec. 24, T. 8 S., R. 9 W.:

O1—½ to ¼ inch, leaves and twigs.

O2—¼ inch to 0, partly decomposed plant remains.

A1—0 to 3 inches, pale-brown (10YR 6/3) silt loam with few, fine, faint mottles of brown (10YR 5/3) and gray (10YR 6/1); weak, fine, granular structure; very friable; abundant roots; few, fine, soft, dark-colored concretions; very strongly acid; clear, smooth boundary.

A2g—3 to 10 inches, light brownish-gray (10YR 6/2) silt loam with common, fine, faint mottles of yellowish brown (10YR 5/4) and gray (10YR 6/1); weak, medium, subangular blocky structure; friable; abundant roots; common, fine, soft, dark-colored concretions; very strongly acid; smooth boundary.

B2tg—10 to 20 inches, about equally mottled light-gray (2.5YR 7/2), pale-brown (10YR 6/3), and brownish-yellow (10YR 6/8) light silty clay loam; mottles are fine and medium; weak, medium, subangular blocky structure; slightly sticky; few fine roots; common fine pores; patchy clay films; common, soft, dark-colored concretions; very strongly acid; diffuse boundary.

B3g—20 to 56 inches +, gray (10YR 6/1) silty clay loam with fine to coarse, distinct mottles of yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6); few lenses of gray silty clay; moderate, medium and coarse, subangular blocky structure; sticky; few fine roots; few, soft, dark-colored concretions; very strongly acid.

The A horizon ranges from pale brown to gray or dark grayish brown in color. The B2tg horizon ranges from silt loam to light silty clay loam. There are common or many, fine or medium mottles. The color of the B3g horizon is dominantly gray mottled with brown and yellowish brown. The texture ranges from heavy silt loam to light silty clay loam.

Cahaba Series

The Cahaba series consists of nearly level and gently sloping, well-drained, medium acid and strongly acid soils on stream terraces. The underlying material is loamy old alluvium.

Cahaba soils are associated with Angie, Stough, and Prentiss soils but are better drained. They lack the compact layer, or fragipan, that is characteristic of Prentiss and Stough soils.

Profile of Cahaba fine sandy loam, 3 to 8 percent slopes, eroded (CbC2), in a moist wooded area, formerly cultivated, in the SW¼SW¼ sec. 13, T. 11 S., R. 10 W.:

Ap—0 to 7 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; abundant roots; few, soft, dark-colored concretions; strongly acid; clear, smooth boundary.

A2—7 to 12 inches, yellowish-brown (10YR 5/6) fine sandy loam; moderate, medium, subangular blocky structure; friable; plentiful roots; few fine pores; few, fine, soft, dark-colored concretions; medium acid; gradual, smooth boundary.

B21t—12 to 23 inches, yellowish-red (5YR 4/8) clay loam; weak, medium, angular blocky structure; firm when moist, slightly plastic when wet; patchy, thin clay films; few fine roots; few fine pores; strongly acid; clear, smooth boundary.

B22t—23 to 44 inches, strong-brown (7.5YR 5/8) sandy clay loam with few, fine, faint mottles of brownish yellow (10YR 6/6), yellowish brown (10YR 5/6),

and red (2.5YR 4/6); moderate, medium, angular blocky structure; firm when moist, slightly plastic when wet; patchy, thin clay films; few fine roots; few fine pores; very strongly acid; gradual, wavy boundary.

C—44 to 56 inches +, yellowish-red (5YR 4/6) fine sandy loam with splotches and streaks of yellowish brown (10YR 5/6); moderate, medium and coarse, angular blocky structure; friable; few fine roots; few fine pores; very strongly acid.

The A horizon ranges from dark grayish brown to yellowish brown in color and from 6 to 15 inches in thickness. The B21t horizon ranges from yellowish red to strong brown in color and is clay loam or sandy clay loam in texture. The B22t horizon is yellowish-red to strong-brown clay loam or sandy clay loam with a few fine mottles of various shades of yellow, brown, and gray. The color of the C horizon is about the same as that of the B22t horizon, but the texture generally is coarser, and the mottles are coarser.

Collins Series

The Collins series consists of moderately well drained, medium acid to very strongly acid soils on the flood plains of the larger streams. These soils formed in recent alluvium.

Collins soils are associated with Ochlockonee, Wehadkee, and Falaya soils. Collins soils are not so well drained as Ochlockonee soils but are better drained than Falaya and Wehadkee soils. Mottling occurs at a greater depth in Collins soils than in Falaya and Wehadkee soils.

Profile of Collins silt loam (Co), in a moist wooded area in the NE¼SW¼ sec. 24, T. 11 S., R. 10 W.:

O2—½ inch to 0, partly decomposed plant remains.

A1—0 to 10 inches, dark-brown (10YR 4/3) silt loam; weak, fine, subangular blocky structure; friable; abundant roots; few, fine, soft and hard, dark-colored concretions; strongly acid; gradual, smooth boundary.

C1—10 to 21 inches, brown (10YR 5/3) loam; weak, medium, subangular blocky structure; friable; few fine pores; plentiful roots; few, fine, soft and hard, dark-colored concretions up to half an inch in diameter; strongly acid; clear, smooth boundary.

C2g—21 to 60 inches +, gray (10YR 6/1) silt loam with many, fine and medium, distinct mottles of yellowish brown (10YR 5/8); moderate, medium, angular blocky structure; slightly sticky; many fine pores; many, fine, soft and hard, dark-colored concretions up to half an inch in diameter; very strongly acid.

The A horizon ranges from brown to dark brown in color. The C1 horizon is silt loam or loam and has a high percentage of sand coarser than very fine sand. The mottles in the C2g horizon vary widely in amount; they are various shades of brown. The depth to mottling ranges from 16 to 30 inches.

Falaya Series

The Falaya series consists of somewhat poorly drained, medium acid to very strongly acid soils. These soils formed in recent alluvium on flat, frequently flooded, active flood plains of streams.

Falaya soils are associated with Wehadkee, Collins, and Ochlockonee soils. Falaya soils are better drained than Wehadkee soils, but they are not so well drained as Collins and Ochlockonee soils. The surface layer of Falaya soils is less gray than that of Wehadkee soils. Falaya soils are grayer nearer the surface than Collins and Ochlockonee soils.

Profile of Falaya silt loam (Fa), in a moist wooded area in the NW¼SE¼ sec. 8, T. 11 S., R. 10 W.:

O1—½ to ¼ inch, leaves and twigs.

O2—¼ inch to 0, partly decomposed plant remains.

A1—0 to 9 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine, subangular blocky structure; friable; abundant roots; few, fine, hard, dark-colored concretions; very strongly acid; clear, smooth boundary.

B1—9 to 15 inches, yellowish-brown (10YR 5/4) silt loam with common, fine, faint mottles of gray (10YR 6/1) and brown (10YR 5/3); weak, medium, angular blocky structure; friable; plentiful roots; many fine pores; few, fine, hard, dark-colored concretions; very strongly acid; clear, wavy boundary.

B2g—15 to 56 inches +, gray (10YR 6/1) silt loam with many, fine and medium, distinct mottles of yellowish brown (10YR 5/8) and brown (10YR 5/3); moderate, medium, subangular blocky structure; firm when moist, slightly sticky when wet; few fine roots; many, soft, dark-colored concretions up to 1 inch in diameter; few fine fragments of chert; very strongly acid.

The A horizon ranges from dark yellowish brown to grayish brown in color. The B1 horizon is yellowish brown to pale brown. The depth to the B2g horizon ranges from 8 to 16 inches. In many places the lower part of this layer is thinly stratified with silty clay loam.

Falkner Series

The Falkner series consists of level and nearly level, somewhat poorly drained, medium acid and strongly acid soils on uplands. These soils formed in a mantle of loess that ranges from a few inches to 30 inches in thickness. The underlying material is made up of fine-textured Coastal Plain sediments.

Falkner soils are associated with Caddo, Hatchie, and Savannah soils. Falkner soils are better drained than Caddo soils. They are underlain by finer textured material than the associated soils and, unlike Hatchie and Savannah soils, lack a fragipan.

Profile of Falkner silt loam, 0 to 1 percent slopes (FkA), in a wet wooded area in the SE¼SW¼ sec. 11, T. 8 S., R. 9 W.:

O2—½ inch to 0, partly decomposed plant remains.

A1—0 to 3 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; many roots; few, fine, hard, dark-colored concretions; slightly acid; abrupt, smooth boundary.

A2—3 to 8 inches, light yellowish-brown (10YR 6/4) silt loam; weak, fine and medium, subangular blocky structure; friable; many fine roots, few pores; few, soft, dark-colored concretions; medium acid; gradual, smooth boundary.

B1—8 to 14 inches, yellowish-brown (10YR 5/6) silt loam; weak, medium, subangular blocky structure; slightly sticky; few roots; few, soft, dark-colored concretions; very strongly acid; gradual, smooth boundary.

B2t—14 to 28 inches, yellowish-brown (10YR 5/6) silty clay loam with common, fine and medium, distinct mottles of gray (10YR 6/1) and brown (10YR 5/3); moderate, fine and medium, subangular blocky structure; sticky; many, fine, hard concretions; very strongly acid; clear, smooth boundary.

IIC—28 to 50 inches +, variegated red (2.5YR 4/6), gray (10YR 6/1), and yellowish-brown (10YR 5/6) clay; massive; very plastic; very strongly acid.

The A horizon ranges from dark grayish brown to yellowish brown in color and from 6 to 12 inches in thickness. The B1 horizon ranges from brown to yellowish brown in color and from silt loam to light silty clay loam in texture. The B2t horizon ranges from yellowish brown to brown and is mottled with various shades of gray and brown. The depth to Coastal Plain material ranges from 12 to 30 inches.

Hatchie Series

The Hatchie series consists of nearly level, somewhat poorly drained, medium acid and strongly acid soils that have a thin mantle of loess. These soils are on uplands. They are underlain by windblown material over Coastal Plain sand, silt, and clay.

Hatchie soils are associated with Caddo and Falkner soils. Hatchie soils are better drained than Caddo soils; their B horizon contains a fragipan. They have a coarser textured lower B horizon than Falkner soils and lack red mottles, which are characteristic of the lower part of Falkner soils.

Profile of Hatchie silt loam, 1 to 3 percent slopes (HaB), in a moist wooded area in the NW¼SW¼ sec. 24, T. 8 S., R. 9 W.:

O2—¼ inch to 0, partly decomposed plant remains.
A1—0 to 3 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; abundant roots; few, soft, dark-colored concretions; strongly acid; clear, smooth boundary.
A2—3 to 7 inches, pale-brown (10YR 6/3) silt loam; weak, medium, subangular blocky structure; friable; abundant roots; common, soft, dark-colored concretions; very strongly acid; gradual, smooth boundary.
B1—7 to 12 inches, pale-brown (10YR 6/3) silt loam with few, fine, faint mottles of brown (10YR 5/3); weak, medium, subangular blocky structure; friable; plentiful roots; few fine pores; common, fine, soft, dark-colored concretions; very strongly acid; gradual, wavy boundary.
B2—12 to 22 inches, pale-brown (10YR 6/3) light silty clay loam with common, fine, distinct mottles of yellowish-brown (10YR 5/4) and gray (10YR 6/1); weak, medium, subangular blocky structure; sticky; few fine roots; few fine pores; common, fine, soft, dark-colored concretions; very strongly acid; gradual, wavy boundary.
A'2x—22 to 42 inches, pale-brown (10YR 6/3) light silty clay loam with common, fine, faint mottles of gray (10YR 6/1) and yellowish brown (10YR 5/4); moderate to strong, medium, angular blocky structure; hard and brittle; few fine roots; common fine pores; many, soft to hard, dark-colored concretions up to 3 inches in diameter; very strongly acid; gradual, irregular boundary.
B'2xtg—42 to 60 inches +, yellowish-brown (10YR 5/8) light silty clay loam with coarse, distinct mottles of gray (10YR 6/1); thin lenses of silty clay; moderate, coarse, subangular blocky structure; sticky; patchy clay films; few fine roots; very strongly acid.

The B2 horizon ranges from pale brown to light yellowish brown in color and from light silty clay loam to silt loam in texture. The A'2x horizon ranges from pale brown to light brownish gray in color and from light silty clay loam to heavy silt loam in texture. The B'2xtg horizon ranges from pale brown to light yellowish brown in color and from light silty clay loam to heavy silt loam in texture. The fragipan is weak to strong and is 18 to 30 inches below the surface.

Lafe Series

The Lafe series consists of somewhat poorly drained and poorly drained soils that are slightly acid or neutral in the surface layer and strongly alkaline in the B and C horizons, which have a high content of sodium and magnesium. These soils are on stream terraces. They are underlain by fine-textured old alluvium washed from the uplands or deposited by streams. Scattered mounds, 50 to 100 feet in diameter and 3 to 4 feet in height, cover about 10 percent of the surface area. The surface layer is coarser textured on the mounds than between them.

Lafe soils are associated with Caddo soils but are finer textured than those soils and are alkaline rather than acid in the B horizon.

Profile of Lafe silt loam (la), in a moist idle area in the NE¼NW¼ sec. 9, T. 10 S., R. 11 W.:

A1—0 to 2 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, angular blocky structure; friable; plentiful fine roots; few, fine, hard, dark-colored concretions; neutral; clear, smooth boundary.
A2—2 to 6 inches, pale-brown (10YR 6/3) silt loam; moderate, fine and medium, angular blocky structure with some evidence of platy structure; friable; common fine roots; few, fine, hard, dark-colored concretions; neutral; clear, smooth boundary.
B21t—6 to 14 inches, pale-brown (10YR 6/3) silt loam with few, fine, faint mottles of brownish yellow (10YR 6/6); moderate, medium, angular blocky structure with some evidence of platy and prismatic structure; friable; few fine roots; few thin lenses of silty clay loam, some of which is in root channels; clay films on peds; soft, dark-colored concretions and concretions of calcium carbonate; neutral; irregular boundary.
B22t—14 to 32 inches, dark-brown (10YR 4/3) light silty clay loam with common, fine, faint mottles of brown (10YR 5/3); prismatic structure; plastic; contains pockets and layers of pale-brown (10YR 6/3), friable silt loam that has weak, medium, platy structure; common clay films on peds; few, fine, hard, dark-colored concretions and concretions of calcium carbonate; strongly alkaline; irregular boundary.
Cg—32 to 70 inches +, mottled gray (10YR 6/1), light yellowish-brown (10YR 6/4), and yellowish-brown (10YR 5/6) clay loam; thin lenses of silt and clay; moderate, medium, subangular blocky structure; plastic; strongly alkaline.

The A horizon ranges from pale brown to grayish brown in color. The B horizon is mottled with various shades of brown, yellow, and gray. In some areas it contains pockets or lenses of silt and clay. The calcium carbonate concretions are more numerous in some places than in others.

Nacogdoches Series

The Nacogdoches series consists of well-drained, medium acid and strongly acid soils on uplands. The underlying material is made up of beds of unconsolidated sand, silt, clay, and gravel.

Nacogdoches soils are associated with Shubuta and Susquehanna soils. They are better drained, coarser textured, and redder than the associated soils.

Profile of Nacogdoches gravelly loam, 2 to 8 percent slopes, eroded (NaC2), in a moist wooded area, formerly cultivated, in the SE¼NE¼ sec. 21, T. 10 S., R. 11 W.:

O1—½ inch to 0, partly decomposed plant remains.
A1—0 to 3 inches, dark reddish-brown (5YR 3/3) gravelly loam; moderate, medium, granular structure; friable;

many fine to medium roots; a little ironstone and sandstone gravel; medium acid; clear, smooth boundary.

A3—3 to 8 inches, dark-red (2.5YR 3/6) gravelly loam; moderate, fine, subangular blocky structure; friable; many fine pores; much ironstone and sandstone gravel up to one-fourth inch in diameter; medium acid; gradual, wavy boundary.

B21t—8 to 14 inches, red (2.5YR 4/8) gravelly sandy clay loam; moderate, medium, subangular blocky structure; friable or firm; common clay films on peds; many fine pores; many fine roots; common ironstone gravel up to 2 inches in diameter; strongly acid; gradual, wavy boundary.

B22t—14 to 25 inches, red (2.5YR 5/8) gravelly sandy clay loam; moderate, medium, subangular blocky structure; firm; common clay films on ped faces; many fine pores; common fine roots; much ironstone and sandstone gravel; thinly laminated horizontal layers of ironstone; very strongly acid; gradual, wavy boundary.

B23t—25 to 41 inches, variegated red (2.5YR 4/8) and brownish-yellow (10YR 6/8) clay loam; moderate, medium, subangular blocky structure; firm when moist, plastic when wet; few fine pores; few fine roots; much ironstone gravel up to 1 inch in diameter; very strongly acid; clear, wavy boundary.

IIC—41 to 72 inches +, light-gray (10YR 7/1) silty clay with common, fine to medium, prominent mottles of dark red (2.5YR 3/6) and brownish yellow (10YR 6/6); strong, medium, angular blocky structure: plastic; few fine roots; few fine pores; a little ironstone gravel; very strongly acid.

The A horizon ranges from dark reddish brown to red in color. The amount and size of gravel vary from one area to another. The B21t horizon ranges from sandy clay loam to clay loam in texture. The B22t horizon ranges from gravelly sandy clay loam or heavy clay loam to clay in texture. The B23t horizon is prominently mottled clay loam to clay.

Ochlockonee Series

The Ochlockonee series consists of well-drained, medium acid and strongly acid soils on bottom lands. These soils formed in recent alluvium.

Ochlockonee soils are associated with Collins, Falaya, and Wehadkee soils. They are better drained than the associated soils and have a browner and generally coarser textured subsoil.

Profile of Ochlockonee very fine sandy loam (Oc), in a moist wooded area in the NE¼SE¼ sec. 35, T. 11 S., R. 10 W.:

O1—¼ inch to 0, partly decomposed plant remains.

A1—0 to 10 inches, dark-brown (7.5YR 4/4) very fine sandy loam; weak, fine, subangular blocky structure; friable; abundant roots; few fine pores; strongly acid; gradual, smooth boundary.

AC—10 to 27 inches, strong-brown (7.5YR 5/6) loam; weak, medium, subangular blocky structure; friable; few fine pores; abundant roots; strongly acid; gradual, smooth boundary.

C1—27 to 42 inches, strong-brown (7.5YR 5/6) loam; moderate, medium, subangular blocky structure; firm; few roots; few, fine, soft, dark-colored concretions; very strongly acid; gradual, smooth boundary.

C2—42 to 60 inches +, strong-brown (7.5YR 5/6) loam with splotches of gray (10YR 6/1); moderate, medium, subangular blocky structure; firm when moist, slightly plastic when wet; few roots; few, fine, soft, dark-colored concretions; very strongly acid.

The A horizon ranges from dark brown to strong brown in color. The C horizon, which is fine sandy loam, loam, or silt loam, contains thin strata of silty clay loam in some places. The color ranges from strong brown to yellowish brown. Splotches or mottles of gray and yellowish brown occur in some places below a depth of 30 inches.

Pheba Series

The Pheba series consists of somewhat poorly drained, medium acid to very strongly acid soils on uplands. The underlying material is made up of beds of unconsolidated sand, silt, and silty clay.

Pheba soils are associated mainly with Caddo and Savannah soils. Pheba soils are better drained than Caddo soils, are more brown, and have a fragipan in the B horizon. Pheba soils are not so well drained as Savannah soils, are less brown in the upper part of the B horizon, and are more mottled.

Profile of Pheba very fine sandy loam, 1 to 3 percent slopes (PeB), in a moist wooded area in the SE¼NW¼ sec. 1, T. 9 S., R. 13 W.:

O1—½ to ¼ inch, leaves and small twigs.

O2—¼ inch to 0, partly decomposed plant remains.

A1—0 to 2 inches, grayish-brown (10YR 5/2) very fine sandy loam; weak, fine, subangular blocky structure; very friable; abundant roots; many, fine, hard, dark-colored concretions; medium acid; clear, smooth boundary.

A2—2 to 6 inches, brown (10YR 5/3) very fine sandy loam with few, fine, faint mottles of light yellowish brown (10YR 6/4); weak, medium, angular blocky structure; friable; abundant roots; many, fine, hard, dark-colored concretions; medium acid; gradual, smooth boundary.

B1—6 to 11 inches, light yellowish-brown (10YR 6/4) very fine sandy loam with common, fine and medium, distinct mottles of yellowish brown (10YR 5/6) and gray (10YR 6/1); weak, medium, angular blocky structure; friable; plentiful roots; few fine pores; common, fine, hard, dark-colored concretions; strongly acid; diffuse boundary.

B2—11 to 17 inches, light yellowish-brown (10YR 6/4) light sandy clay loam with common, fine and medium, distinct mottles of yellowish brown (10YR 5/6) and gray (10YR 6/1); weak, medium, angular blocky structure; friable; few patchy clay films; plentiful roots; common fine pores; few, fine, hard, dark-colored concretions; very strongly acid; gradual. wavy boundary.

A'2g—17 to 20 inches, mottled gray (10YR 6/1), pale-brown (10YR 6/3), and yellowish-brown (10YR 5/6) loam; weak, medium, angular blocky structure; slightly brittle; common fine pores; few fine roots; few, fine, hard, dark-colored concretions; very strongly acid; clear, smooth boundary.

B'xtg—20 to 32 inches, mottled gray (10YR 6/1), yellowish-brown (10YR 5/8), and brownish-yellow (10YR 6/6) loam; mottles are fine to coarse; moderate, medium and coarse, angular blocky structure; firm and brittle; patchy clay films; few fine roots; many fine pores; few, fine, hard, dark-colored concretions; very strongly acid; gradual, irregular boundary.

Cg—32 to 60 inches +, mottled gray (10YR 6/1), brown (10YR 5/3), and yellowish-brown (10YR 5/8) sandy clay loam; mottles are fine to coarse; moderate, medium and coarse, subangular blocky structure; slightly sticky; patchy clay films; many fine pores; few fine roots; few, hard, dark-colored concretions up to one-fourth inch in diameter; very strongly acid.

The A horizon ranges from dark gray to brown in color. The B1 horizon ranges from light yellowish brown to yellowish brown in color and from very fine sandy loam to light sandy clay loam in texture. The B2

horizon is light yellowish brown to pale brown heavy sandy loam to sandy clay loam. The B'xtg horizon is loam, silt loam, or light sandy clay loam. The depth to the fragipan ranges from 18 to 36 inches.

Prentiss Series

The Prentiss series consists of moderately well drained, medium acid and strongly acid soils on stream terraces. The underlying material is made up of sediments washed from Ruston, Savannah, Shubuta, and other soils on uplands.

Prentiss soils are associated with Cahaba soils, which are better drained, and with Stough and Caddo soils, which are not so well drained. Prentiss soils have a yellow to yellowish-brown B horizon, whereas Cahaba soils have a red or reddish-brown B horizon. Prentiss soils are not mottled in the upper part of the B horizon; Stough and Caddo soils are distinctly mottled throughout the B horizon.

Profile of Prentiss very fine sandy loam, 1 to 3 percent slopes (PrB), in a moist wooded area, formerly cultivated, in the NW¼SE¼ sec. 25, T. 11 S., R. 10 W.:

A1—0 to 4 inches, grayish-brown (10YR 5/2) very fine sandy loam; weak, fine, subangular blocky structure; friable; plentiful roots; few, fine, hard, dark-colored concretions; strongly acid; abrupt, smooth boundary.

A2—4 to 10 inches, light yellowish-brown (10YR 6/4) silt loam; weak, medium, subangular blocky structure; friable; plentiful roots; few fine pores; few, fine, soft and hard, dark-colored concretions; strongly acid; clear, smooth boundary.

B1—10 to 14 inches, yellowish-brown (10YR 5/8) silt loam; weak, medium, angular blocky structure; friable; few fine roots; few fine pores; few, fine, hard, dark-colored concretions; very strongly acid; gradual, smooth boundary.

B2t—14 to 26 inches, yellowish-brown (10YR 5/8) light silty clay loam; weak, medium, angular blocky structure; firm; thin, patchy clay films; few fine pores; few, fine, hard, dark-colored concretions; few fragments of chert; very strongly acid; gradual, wavy boundary.

Bx—26 to 48 inches, light brownish-gray (10YR 6/2) silt loam with common, fine, faint mottles of yellowish brown (10YR 5/8) and gray (10YR 6/1); moderate to strong, medium, angular blocky structure; firm and brittle; few fine roots; many fine pores; many, fine, soft and hard, dark-colored concretions; very strongly acid; gradual, irregular boundary.

C—48 to 62 inches +, mottled gray (10YR 6/1), strong-brown (7.5YR 5/8), and yellowish-brown (10YR 5/8) clay loam; moderate, medium, subangular blocky structure; plastic; few fine roots; very strongly acid.

The A horizon ranges from dark grayish brown to light yellowish brown in color. The B1 horizon ranges from yellowish brown to brownish yellow in color. The B2t horizon is yellowish-brown to brown silt loam to light silty clay loam. The Bx horizon is silt loam to loam. The depth to the fragipan, which is more strongly developed in some places than in others, ranges from 18 to 36 inches. The C horizon ranges from silt loam to light silty clay loam.

Ruston Series

The Ruston series consists of gently sloping, well-drained, medium acid to very strongly acid soils on uplands. The underlying material is made up of beds of unconsolidated sand, silt, and sandy clay.

Ruston soils are associated with Bowie, Saffell, Savannah, and Shubuta soils. Ruston soils are better drained than Savannah soils, which have a fragipan. They are less permeable than Saffell soils, which contain large amounts of gravel. Ruston soils are not so fine textured in the subsoil as Shubuta and Bowie soils.

Profile of Ruston fine sandy loam, 3 to 8 percent slopes, eroded (RuC2), in a moist pasture in the SE¼NW¼ sec. 24, T. 11 S., R. 9 W.:

Ap—0 to 7 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; very friable; abundant roots; a little fine chert gravel; medium acid; abrupt, wavy boundary.

B1—7 to 13 inches, strong-brown (7.5YR 5/6) loam; weak, fine and medium, subangular blocky structure; friable; abundant roots; a little fine chert gravel; medium acid; gradual, smooth boundary.

B2t—13 to 32 inches, yellowish-red (5YR 4/8) light sandy clay loam; moderate, medium and coarse, subangular blocky structure; slightly plastic; thin, patchy clay films; plentiful roots; few fine pores; a little fine chert gravel; strongly acid; gradual, smooth boundary.

B3&A'2—32 to 44 inches, strong-brown (7.5YR 5/8) sandy loam; weak, fine and medium, angular blocky structure; friable; few thin lenses of sand; a little chert gravel up to one-half inch in diameter; very strongly acid; abrupt, wavy boundary.

B'1—44 to 60 inches +, mottled red (2.5YR 4/8), reddish-yellow (7.5YR 6/8), and gray (10YR 6/1) sandy loam; few lenses of sand and clay; moderate, medium, subangular blocky structure; firm; a little chert gravel up to one-half inch in diameter; very strongly acid.

The Ap horizon ranges from yellowish brown to grayish brown in color. The B2t horizon is strong-brown to yellowish-red heavy sandy loam, light sandy clay loam, or loam; the clay content is 18 to 30 percent. The clay content of the profile indicates weak bisequum development.

Saffell Series

The Saffell series consists of gently sloping to moderately steep, well-drained, medium acid and strongly acid soils on uplands. These soils are underlain by gravelly Coastal Plain material.

Saffell soils are associated with Ruston and Shubuta soils, but Saffell soils contain large amounts of gravel.

Profile of Saffell gravelly fine sandy loam, 3 to 8 percent slopes (SaC), in a moist idle field in the NE¼NE¼ sec. 27, T. 9 S., R. 11 W.:

A1—0 to 1 inch, very dark grayish-brown (10YR 3/2) gravelly fine sandy loam; weak, fine, granular structure; very friable; many fine roots; chert and quartz gravel up to 1½ inches in diameter; medium acid; clear, irregular boundary.

A2—1 to 7 inches, reddish-brown (5YR 4/4) gravelly fine sandy loam; vertical tongues of grayish brown extend from A1 horizon; weak, medium, subangular blocky structure; many fine roots; chert and quartz gravel up to 1½ inches in diameter; medium acid; gradual, smooth boundary.

B2t—7 to 36 inches, yellowish-red (5YR 4/6) gravelly sandy loam; moderate, medium, subangular blocky structure; friable; common fine roots and clay films; quartz and chert gravel less than 1 inch in diameter makes up about 60 percent, by volume; strongly acid; clear, wavy boundary.

C—36 to 65 inches +, light yellowish-brown (10YR 6/4) gravelly sandy loam; structureless; loose; gravel up to 2 inches in diameter makes up about 60 percent, by volume; very strongly acid.

The gravel content of the A horizon ranges up to 60 percent, by volume. The B2t horizon ranges from reddish brown to red in color and from gravelly sandy loam to sandy clay loam in texture. More than 50 percent, by volume, is gravel. The texture of the C horizon ranges from sandy loam to sandy clay loam; there are a few thin layers of clay. The gravel content normally is more than 50 percent, by volume.

Savannah Series

The Savannah series consists of nearly level to sloping, moderately well drained, medium acid and strongly acid soils on uplands. The underlying material is made up of beds of unconsolidated sand, silt, and sandy clay.

Savannah soils are associated mainly with Ruston and Caddo soils, which lack a fragipan. Savannah soils are not so well drained nor so permeable as Ruston soils. They are better drained than Caddo soils, which are more strongly mottled.

Profile of Savannah very fine sandy loam, 1 to 3 percent slopes (ShB), in a moist wooded area:

O2—1 inch to 0, partly decomposed plant remains.

A1—0 to 5 inches, dark grayish-brown (10YR 4/2) very fine sandy loam; weak, fine, granular structure; very friable; many roots; few, fine, hard, dark-colored concretions; slightly acid; clear, smooth boundary.

A2—5 to 14 inches, light yellowish-brown (10YR 6/4) very fine sandy loam; weak, medium, subangular blocky structure; very friable; many fine roots; few, fine, hard, dark-colored concretions; strongly acid; gradual, smooth boundary.

B1—14 to 21 inches, yellowish-brown (10YR 5/8) very fine sandy loam; weak, medium, subangular blocky structure; very friable; many fine roots; few, fine, hard, dark-colored concretions; strongly acid; gradual, smooth boundary.

B2t—21 to 28 inches, yellowish-brown (10YR 5/8) light sandy clay loam; weak to moderate, medium, subangular blocky structure; friable; patchy clay films; few fine roots; few pores; few soft and few hard, dark-colored concretions; very strongly acid; gradual, irregular boundary.

Bx—28 to 50 inches, yellowish-brown (10YR 5/8) loam with common, fine, distinct mottles of gray (10YR 6/1) and pale brown (10YR 6/3); moderate to strong, medium, angular blocky structure; firm, compact, and brittle; few patchy clay films; many pores; few soft concretions; very strongly acid; abrupt, wavy boundary.

C—50 to 62 inches +, variegated gray (10YR 5/1), red (2.5YR 4/8), reddish-yellow (7.5YR 6/8), and yellowish-brown (10YR 5/8) sandy clay loam; lenses of clay and sand; moderate, medium, subangular blocky structure; slightly plastic; a little chert and quartz gravel; very strongly acid.

The A horizon ranges from dark grayish brown to yellowish brown in color, and the B1 horizon from light yellowish brown to yellowish brown. The B2t horizon ranges from yellowish brown to brown in color and from light sandy clay loam to loam in texture. The Bx horizon ranges from loam to sandy clay loam and is mottled with various shades of gray and brown. The fragipan is more strongly developed in some areas than in others and is from 18 to 36 inches below the surface. The C horizon generally is light brownish gray mottled with gray, brown, and, in places, red. It contains a few lenses of sand and clay.

Shubuta Series

The Shubuta series consists of gently sloping to moderately steep, moderately well drained, medium acid and strongly acid soils on uplands. The underlying material is made up of thinly stratified beds of unconsolidated sandy, silty, and clayey Coastal Plain deposits.

Shubuta soils are associated mainly with Boswell, Tippah, and Susquehanna soils. Shubuta soils are better drained, are more friable, and have a coarser textured subsoil than Susquehanna soils. They have a redder subsoil than Tippah soils and a sandier subsoil than Boswell soils.

Profile of Shubuta fine sandy loam, 3 to 8 percent slopes (SmC), in a moist wooded area in the SW¼SW¼ sec. 33, T. 11 S., R. 10 W.:

O2—½ inch to 0, partly decomposed plant remains.

A1—0 to 2 inches, grayish-brown (10YR 5/2) fine sandy loam; weak, medium, granular structure; friable; many fine to medium roots; few, fine, hard, dark-colored concretions; medium acid; clear, smooth boundary.

A2—2 to 7 inches, yellowish-brown (10YR 5/6) fine sandy loam; few grayish-brown tongues extend from A1 horizon; weak, fine, subangular blocky structure; friable; many fine roots; few, fine, hard, dark-colored concretions; a little chert gravel; medium acid; clear, smooth boundary.

B21t—7 to 14 inches, red (2.5YR 4/8) sandy clay; moderate, medium, angular blocky structure; very firm; common clay films; common fine pores; few, fine, hard, dark-colored concretions; a little chert gravel; strongly acid; gradual, wavy boundary.

B22t—14 to 25 inches, yellowish-red (5YR 5/6) sandy clay with common, medium and coarse, distinct mottles of dark red (2.5YR 3/6) and reddish yellow (7.5YR 6/6); moderate, medium, angular blocky structure; firm; common clay films; few fine roots; common fine pores; strongly acid; gradual, wavy boundary.

B3—25 to 60 inches +, variegated dark-red (2.5YR 3/6), light-gray (10YR 7/2), reddish-yellow (5YR 6/6), and yellowish-brown (10YR 5/4) sandy clay loam; small pockets of fine sandy loam; moderate, medium and coarse, angular blocky structure with some evidence of prismatic structure; firm; very strongly acid; gradual, wavy boundary.

The A horizon ranges from grayish brown to yellowish brown in color and from 6 to 14 inches in thickness. It is gravelly in a few places. The B21t horizon ranges from red to yellowish red in color and from sandy clay to clay in texture. The B22t horizon is red to yellowish-red sandy clay loam to clay and is mottled with darker red, reddish yellow, and gray. The mottles in the B3 horizon vary in number and size.

Stough Series

The Stough series consists of somewhat poorly drained, medium acid to very strongly acid soils on stream terraces. The underlying material consists of sediments washed from the Coastal Plain uplands.

Stough soils are associated with Cahaba, Prentiss, and Caddo soils. Stough soils are not so well drained as Cahaba and Prentiss soils and have a more mottled subsoil. Stough soils have a fragipan; Cahaba soils do not. Stough soils are better drained than Caddo soils and have more yellow in their subsoil.

Profile of Stough silt loam, 1 to 3 percent slopes (StB), in a moist wooded area in the NE¼SE¼ sec. 36, T. 11 S., R. 10 W.:

O1—½ to ¼ inch, leaves and small twigs.
O2—¼ inch to 0, partly decomposed plant remains.
A1—0 to 4 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; very friable; plentiful roots; few, fine, hard, dark-colored concretions; strongly acid; clear, smooth boundary.
A2—4 to 7 inches, pale-brown (10YR 6/3) silt loam with few, fine, faint mottles of yellowish brown (10YR 5/4); weak, fine and medium, subangular blocky structure; friable; plentiful roots; few, fine, hard, dark-colored concretions; strongly acid; gradual, smooth boundary.
B2t—7 to 17 inches, light yellowish-brown (10YR 6/4) silt loam with common, fine, faint and distinct mottles of gray (10YR 6/1) and yellowish brown (10YR 5/6); moderate, medium, angular blocky structure; firm; common fine roots; common fine pores; few, fine, hard, dark-colored concretions; very strongly acid; gradual, wavy boundary.
Bxt—17 to 42 inches, mottled gray (10YR 6/1), brownish-yellow (10YR 6/6), and yellowish-brown (10YR 5/6) silt loam; moderate, medium, angular blocky structure; firm and brittle; few fine roots; common fine pores; few, fine, hard, dark-colored concretions; very strongly acid; clear, irregular boundary.
B3g—42 to 60 inches +, gray (10YR 6/1) light silty clay loam with common, fine and medium, distinct mottles of brownish yellow (10YR 6/8); few thin lenses of light-gray silt; moderate, medium, subangular blocky structure; slightly plastic; very strongly acid.

The A1 horizon ranges from dark grayish brown to brown in color, and the B2t horizon from light yellowish brown to yellowish brown. The texture throughout the B horizon is loam, silt loam, and light silty clay loam. The depth to the fragipan ranges from 12 to 36 inches.

Susquehanna Series

The Susquehanna series consists of nearly level to steep, somewhat poorly drained, strongly acid to extremely acid soils on uplands. The underlying material is made up chiefly of thick beds of acid clay and soft clay shale.

Susquehanna soils are associated mainly with Boswell and Tippah soils. The subsoil of Susquehanna soils is less red than that of Boswell soils and is finer textured and less brown that that of Tippah soils.

Profile of Susquehanna very fine sandy loam, 0 to 1 percent slopes (SvA), in a moist wooded area:

O1—1 to ½ inch, leaves and twigs.
O2—½ inch to 0, partly decomposed plant remains.
A1—0 to 5 inches grayish-brown (10YR 5/2) very fine sandy loam; weak, fine, granular structure; very friable; plentiful roots; strongly acid; abrupt, smooth boundary.
B21t—5 to 16 inches, mottled gray (10YR 6/1), red (2.5YR 4/8), and yellowish-red (5YR 5/6) clay; moderate, medium, subangular blocky structure; very plastic; plentiful roots; continuous clay films; very strongly acid; gradual, smooth boundary.
B22t—16 to 35 inches, light-gray (10YR 7/1) clay with many, fine, distinct mottles of red (2.5YR 5/8); coarse prismatic breaking to strong to moderate, medium, subangular blocky structure; very sticky and plastic; few fine roots; continuous clay films; extremely acid; diffuse boundary.
B23—35 to 60 inches +, light-gray (2.5YR 7/2) clay with few, fine, distinct mottles of red (2.5YR 4/8) and yellowish brown (10YR 5/8); coarse prismatic breaking to strong to moderate, medium, subangular blocky structure; very sticky and plastic; few fine roots; few, fine, soft, dark-colored concretions; extremely acid.

The A horizon is very fine sandy loam or silty clay. It ranges from dark gray to grayish brown in color and from 4 to 8 inches in thickness. The texture of the B horizon is clay or silty clay.

Tippah Series

The Tippah series consists of level to moderately steep, moderately well drained, medium acid and strongly acid soils on uplands. These soils developed in a thin mantle of loess over fine-textured Coastal Plain material.

Tippah soils are associated with Susquehanna, Boswell, Shubuta, and Savannah soils. Tippah soils are better drained than Susquehanna soils and are not so fine textured in the B horizon. They contain more silt than Boswell and Shubuta soils and are less red in the B horizon. In contrast to Savannah soils, Tippah soils lack a fragipan and are finer textured in the B horizon.

Profile of Tippah silt loam, 0 to 1 percent slopes (TcA), in a moist wooded area:

O1—1 inch to 0, partly decomposed plant remains.
A1—0 to 5 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; very friable; many roots; a little fine chert gravel; medium acid; clear, smooth boundary.
A2—5 to 7 inches, yellowish-brown (10YR 5/4) silt loam; weak, fine, subangular blocky structure; friable; many fine roots; many fine pores; a little fine chert and quartz gravel; strongly acid; clear, smooth boundary.
B1—7 to 10 inches, strong-brown (7.5YR 5/6) silt loam; weak, medium, subangular blocky structure; friable; few clay films in cavities; common fine roots; many fine pores; many, fine, hard, dark-colored concretions; a little chert and quartz gravel; very strongly acid; gradual, smooth boundary.
B21t—10 to 17 inches, strong-brown (7.5YR 5/8) loam; moderate, medium, subangular blocky structure; firm; common clay films on ped faces; common fine roots; common fine pores; a little fine chert gravel; very strongly acid; gradual, smooth boundary.
B22t—17 to 24 inches, yellowish-red (5YR 4/6) light silty clay loam with common, fine and medium, distinct mottles of very pale brown (10YR 7/3); moderate, medium and coarse, subangular blocky structure; firm; common clay films; few fine roots; a little chert gravel; very strongly acid; gradual, smooth boundary.
B23t—24 to 32 inches, light brownish-gray (10YR 6/2) light silty clay loam with common, fine, distinct mottles of yellowish red (5YR 4/6) and brown (10YR 5/3); weak, medium, angular blocky structure; friable or firm; few clay films in pores and cavities; few fine roots; a little chert gravel; very strongly acid; abrupt, smooth boundary.
IIB24t—32 to 62 inches +, gray (10YR 5/1) silty clay with common, fine, prominent mottles of dark red (2.5YR 3/6) and red (2.5YR 4/8); strong, medium, angular blocky structure; extremely firm; major cracks are vertical; few fine roots; a little fine quartz gravel; very strongly acid.

The A horizon ranges from very dark grayish brown to yellowish brown in color. The B1 horizon is silt loam or loam and ranges from strong brown to yellowish brown in color. The B21t horizon is strong-brown to yellowish-brown loam or heavy silt loam to silty clay loam. The B22t horizon is yellowish-red to strong-brown heavy silt loam, light silty clay loam, or loam. The IIB24t horizon is heavy silty clay loam to silty clay. The depth to this horizon ranges from 16 to 30 inches.

Wehadkee Series

The Wehadkee series consists of poorly drained, slowly permeable, acid soils. These soils formed in recent alluvium on flat, frequently flooded, active flood plains.

Wehadkee soils are associated with Ochlockonee, Collins, and Falaya soils. They are more poorly drained and grayer in color than any of these associated soils, and they have a finer textured surface layer than Ochlockonee soils.

Profile of Wehadkee silt loam (Wa), in a moist wooded area:

O1—½ inch to 0, partly decomposed plant remains.

A1—0 to 6 inches, light brownish-gray (10YR 6/2) silt loam with few, fine, faint mottles of gray (10YR 5/1); weak, medium, subangular blocky structure; friable; abundant roots; few, fine, hard, dark-colored concretions; very strongly acid; clear, smooth boundary.

B21g—6 to 24 inches, gray (10YR 6/1) silt loam with many, fine, faint and distinct mottles of brown (10YR 5/3) and yellowish brown (10YR 5/4); moderate, medium, subangular blocky structure; friable; plentiful roots; many fine pores; many, fine, soft and hard, dark-colored concretions; very strongly acid; diffuse boundary.

B22g—24 to 54 inches +, gray (10YR 6/1) silty clay loam with many, fine and medium, distinct mottles of yellowish brown (10YR 5/8); thin lenses of sandy clay; moderate, medium, subangular blocky structure; firm when moist, plastic when wet; many, soft and hard, brown concretions; very strongly acid.

The A horizon is gray in places. The B horizon ranges from gray to light gray in color. The B22g horizon is silt loam in places.

Weston Series

The Weston series consists of somewhat poorly drained, medium acid to very strongly acid soils. The underlying material is made up of beds of unconsolidated sand, silt, and clay.

Weston soils are associated with Angie, Caddo, and Pheba soils. They are coarser textured than any of the associated soils and are better drained than Caddo soils. In contrast to Pheba soils, Weston soils lack a fragipan.

Profile of Weston fine sandy loam, 0 to 1 percent slopes (Wsa), in a moist wooded area:

O1—1 to ¼ inch, leaves and twigs.

O2—¼ inch to 0, partly decomposed leaf litter.

A1—0 to 3 inches, grayish-brown (10YR 5/2) fine sandy loam; weak, medium, subangular blocky structure; very friable; abundant roots; few, fine, soft, dark-colored concretions; slightly acid; clear, smooth boundary.

A2—3 to 8 inches, pale-brown (10YR 6/3) fine sandy loam with few, fine, faint mottles of brownish yellow (10YR 6/8); weak, medium, subangular blocky structure; friable; plentiful roots; few fine pores; few, fine, hard, dark-colored concretions; strongly acid; gradual, smooth boundary.

B2g—8 to 22 inches, gray (10YR 6/1) heavy sandy loam with common, fine and medium, distinct mottles of brownish yellow (10YR 6/8); weak, medium, subangular blocky structure; firm or friable; plentiful roots; many fine pores; few, fine, soft and hard, dark-colored concretions; very strongly acid; gradual, wavy boundary.

B3g—22 to 40 inches, mottled light-gray (10YR 7/1), yellowish-brown (10YR 5/6), and brownish-yellow (10YR 6/6) fine sandy loam; moderate, medium, subangular blocky structure; friable; many fine pores; few, fine, hard, dark-colored concretions; very strongly acid; diffuse boundary.

C—40 to 54 inches +, mottled gray (10YR 6/1) and yellowish-brown (10YR 5/8) alternate layers of sand, silt, and clay; very strongly acid.

The A horizon ranges from 6 to 12 inches in thickness. The color of the A1 horizon is dark grayish brown to light brownish gray; that of the A2 horizon is light brownish gray or pale brown, with mottles of brownish yellow and yellowish brown. The texture of the B2g horizon is sandy loam, silt loam, or loam. The color is gray or light gray mottled with various shades of brown and yellow. The B3g horizon ranges from fine sandy loam to loam in texture and from light gray to gray in color.

Additional Facts About the County

Cleveland County was formed in 1873 from parts of Bradley, Lincoln, Jefferson, and Dallas Counties. It was first called Dorsey County, but the name was changed to Cleveland on March 5, 1885, in honor of Grover Cleveland, who had just been elected President of the United States.

The first settlers came from Virginia and the Carolinas in about 1834 and settled near New Edinburg and Toledo. They found most of the area covered with a thick growth of pines and hardwoods. Only a small part, just southeast of Saline, was prairie. The settlers cleared tracts of land on the high, well-drained ridges and grew cotton as a cash crop and corn, potatoes, and other vegetables. Agriculture developed slowly, grew steadily until the outbreak of World War II, and then declined. Lumbering has become the chief source of income.

Major towns in the county are Rison, which had a population of 889 in 1960, New Edinburg, and Kingsland. Other important trading centers are Pansy, Rye, Herbine, Toledo, Rowell, Calmer, Saline, and Kedron. The population totaled 8,370 in 1880 and 6,944 in 1960.

Physiography

All of Cleveland County is on the forested Gulf Coastal Plain. The county is 24 miles long from north to south, 30 miles wide at the northern boundary, and 21 miles wide at the southern boundary. For the most part, this county slopes gently southward. Moro Creek forms most of the western boundary. The Saline River enters the northwestern part and leaves at the southeastern edge. Hudgin Creek flows through the eastern part. Smaller streams are Big Creek, Derrieusseaux Creek, Panther Creek, and Crabapple Creek.

The three main topographic divisions in this county are (1) the rolling to hilly uplands; (2) the terraces, or second bottoms; and (3) the flood plains, or first bottoms. The uplands occur as long strips that run north and south between the streams. They are nearly level to steep and range from less than 1 mile to several miles in width. The erosion hazard ranges from none to severe. The terraces occur as long, narrow belts along the major streams. They range from gently sloping to flat. The flat areas are poorly drained and are known locally as pin-oak flats. Erosion is not a limiting hazard, even on

the gentle slopes. The flood plains occur as wide, poorly drained bottom lands along sluggish streams. The best drained areas are near the larger streams.

Six natural lakes have formed in old channels of the Saline River. They are Crane Lake, Grays Lake, Upper and Lower Canada Lakes, Little Lake, and Wilson Lake. Also, there is an intricate network of sloughs. The sloughs overflow frequently in winter and spring.

The elevation in Cleveland County ranges from 150 to 275 feet above sea level.

Climate [9]

Cleveland County has warm summers, mild winters, and ample precipitation that is well distributed throughout the year. Table 12 shows data on temperature and precipitation from the U.S. Weather Bureau Stations at Pine Bluff in Jefferson County and Warren in Bradley County. The data are representative of Cleveland County.

This county is on the borderline between tropical and continental weather forces. It is near enough to the Gulf of Mexico to be humid the year round and to have local showers in summer and moderate to heavy rains in winter. Yet it is well within the reach of polar and arctic air masses.

The temperature reaches 100°F. in at least 80 to 90 percent of the summers. In contrast, subzero temperatures are rare and of short duration. The growing season is long. The average length of the frost-free season is 236 days, or nearly 8 months. Fronts cause pronounced temperature changes in winter and early in spring.

Records at the U.S. Weather Bureau Stations in Pine Bluff and Warren, Ark., show that, on the average, a temperature of 32° F. can occur as late as March 19 and as early as November 10. The earliest that a temperature of 32° has occurred is October 18 (in 1948), and the latest is April 16 (in 1928). A temperature of 28° can occur, on the average, as early as March 4 and as late as November 14; this is a period of 255 days. The earliest that a temperature of 28° has occurred is October 21 (in 1952), and the latest is March 28 (in 1955).

Nearly 70 percent of the annual precipitation falls between the first of November and the last of May. Rains are general in these seasons; those in summer are erratic and are intense in some parts of the county.

Thunderstorms occur on an average of 60 days per year. Tornadoes occur most frequently between the first of March and the last of June. Twenty-two tornadoes were recorded in the 46-year period, 1916-61.

The average annual snowfall amounts to 2.8 inches and represents less than 1 percent of the total precipitation. There is a 40 to 50 percent chance that only a trace or less of snow will fall in any given year.

Glaze and freezing rain are infrequent. They are likely when warm moist air from the Gulf overrides cold air on the ground.

Dry spells and droughts occur during summer. Well below 1 inch of rain falls in some months, although the probability of this small an amount is less than 10 per cent for any given month.

Droughts are considerably less frequent in this county than in the plains States to the west and northwest. The frequency is more comparable to that in the Great Lakes area and in the Central Atlantic States. During the growing season, April 1 through October 31, there is only about a 20 percent chance of a mild drought, but such droughts can be 3 to 4 months long. Severe and extreme droughts, those during which only the most drought-resistant native plants survive, occur only 2 to

[9] R. O. Reinhold, meteorologist, U.S. Weather Bureau Station, Little Rock, Ark., assisted in the preparation of this section.

TABLE 12.—*Temperature and precipitation data*

[All data from Pine Bluff, Jefferson County, and Warren, Bradley County, Ark., for 1921 through 1962]

Month	Temperature				Precipitation		
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average total [1]	One year in 10 will have—	
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—
	°F.	°F.	°F.	°F.	Inches	Inches	Inches
January	56	35	78	12	5.60	1.89	10.63
February	59	38	80	16	5.10	1.84	9.84
March	67	44	86	24	5.60	3.16	9.28
April	76	53	90	35	5.37	2.22	8.61
May	83	61	94	46	5.00	1.96	9.70
June	91	69	100	56	3.47	.88	7.54
July	94	72	104	63	4.13	.57	8.52
August	94	71	106	61	2.82	.59	6.15
September	89	64	101	48	3.25	.82	5.38
October	79	53	93	34	2.90	.38	6.16
November	65	42	84	23	4.70	1.45	8.96
December	57	37	78	16	5.05	1.88	10.48

[1] The average total precipitation is 52.99 inches.

4 percent of the time. Since 1931, such droughts have occurred during the growing season only in 1936, 1943, and 1954.

The evaporation rate is high during summer; it ranges up to one-third of an inch per day. The average annual rate is almost 60 inches, which is slightly in excess of the average total precipitation (see table 12). Thus, in spite of the fairly substantial annual rainfall, a large amount of soil moisture is lost during rain-free periods in the hot summer months.

Agriculture

The 1959 Census of Agriculture compares farm data in Cleveland County for the years 1954 and 1959. The census figures show that the total land in farms in these years decreased from 169,503 acres to 93,704 acres, and the number of farms from 1,231 to 773. The average size of farms decreased from 137.7 acres to 121.2 acres. Following is a list of the number of farms of specified sizes for the year 1959.

Size in acres	*1959*
10 or less	51
10 to 49	210
50 to 69	75
70 to 99	141
100 to 139	100
140 to 179	59
180 to 219	42
220 to 259	27
260 to 499	49
500 to 999	15
1,000 or more	4

General farming is practiced on the better drained ridges of the uplands and on some of the better drained terraces and bottom lands. The most common crops are cotton, corn, hay, tomatoes, and pasture.

Industries

About 80 percent of Cleveland County is woodland owned largely by commercial timber companies and large lumber mills. Three small sawmills are operating in the county, but most of the timber is shipped to larger mills in nearby Warren, Fordyce, and Pine Bluff. Cleveland County has four cotton gins, and there is a brick plant at Kingsland. Not all of these industries are operating at present. Large amounts of sand and gravel are exported annually.

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Glossary

Acidity. (See Reaction, soil).

Aggregate, soil. Many fine particles held in a single mass or cluster, such as a granule, clod, block, or prism.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity. The difference between the amount of water in a soil at field capacity and the amount in the same soil at the permanent wilting point. Commonly expressed as inches of water per inch depth of soil.

Clay. As a soil separate, mineral particles less than 0.002 millimeter in diameter. As a textural class, soil that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent; will not hold together in a mass.

Friable.—When moist, soil crushes easily under gentle to moderate pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, soil crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, soil is readily deformed by moderate pressure but can be pressed into a lump; forms a wire when rolled between thumb and forefinger.

Sticky.—When wet, soil adheres to other material; tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, soil moderately resists pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, soil breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Crop rotation. A systematic changing of crops grown on the same land to help prevent soil exhaustion. A cropping plan.

Doyle rule. A rule for determining the number of board feet in a log.

Drainage, soil. The rapidity and extent of the removal of water from the soil by runoff and by flow through the soil to underground spaces. (See also Natural drainage.)

Erosion. The wearing away of the land surface by wind, running water, and other geological agents.

Field capacity. The amount of moisture that the soil will hold against the forces of gravity; the water left after runoff and downward internal drainage have ceased.

Fragipan. A very compact horizon, rich in silt, sand, or both, and usually relatively low in clay. It commonly interferes with penetration of roots and water. When dry the material appears to be cemented, but when moist the apparent cementation disappears.

Graded rows. Rows arranged with a slight grade or drop in elevation so that water flows off slowly without washing.

Horizon, soil. A layer of soil, approximately parallel to the soil surface, that has distinct characteristics produced by soil-forming processes.

Internal drainage. The movement of water through the soil profile. The rate of movement is affected by the texture, structure, and other characteristics of the surface soil and subsoil. Relative terms for expressing internal drainage are *none, very slow, slow, medium, rapid,* and *very rapid.*

Loam. Soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Loess. A fine-grained, wind-transported deposit consisting dominantly of silt-sized particles.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Natural drainage. Drainage that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. The classes of natural drainage used in this report are—

Poorly drained.—Water is removed so slowly that the soil remains wet for a large part of the time. The water table is commonly at or near the surface during a considerable part of the year.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods but not all of the time.

Moderately well drained.—Water is removed somewhat slowly, and the soil is wet for a small but significant part of the time.

Well drained.—Water is removed readily but not rapidly. A well-drained soil has good drainage.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block, in contrast to a clod.

Perched water table. A layer of saturation in the soil, separated from the true ground water table and held above it by a layer of impervious material.

Permeability, soil. The quality that enables a soil to transmit water and air. Terms used to describe permeability are *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Phase. A subdivision of a soil type, series, or other unit in the soil classification system, made because of differences that affect the management of soils but not their classification. A soil type, for example, may be divided into phases because of differences in slope, stoniness, thickness, or some other characteristic that affects management.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Runoff. The rate at which water is removed by flow over the surface of the soil. The rapidity of runoff and the amount of water removed are closely related to slope and are also affected by factors such as texture, structure, and porosity of the surface soil; the vegetative covering; and the prevailing climate. Terms used to describe runoff are as follows:

Ponded.—None of the water added to the soil as precipitation or by flow from surrounding higher areas escapes as runoff. Removal is by movement through the soil or by evaporation.

Very slow.—Surface water flows away so slowly that free water lies on the surface for long periods or enters immediately into the soil. Very little of the water is removed by runoff.

Slow.—Surface water flows away so slowly that free water covers the soil for significant periods or enters the soil so rapidly that only a small amount is removed as runoff. Normally, there is little or no erosion hazard.

Medium.—Surface water flows away at such a rate that a moderate proportion of the water enters the soil profile, and free water lies on the surface for only short periods. The loss of water over the surface does not reduce seriously the supply available for plant growth. This commonly is considered good external drainage. The erosion hazard may be slight to moderate if soil of this class is cultivated.

Rapid.—A large part of the precipitation moves rapidly over the surface of the soil, and a small part moves through the soil profile. The erosion hazard commonly is moderate to high.

Very rapid.—A very large part of the water moves rapidly over the surface of the soil, and a very small part goes through the profile. The erosion hazard is commonly high or very high.

Sand. As a soil separate, individual rock or mineral fragments ranging from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz, but sand may be of any mineral composition. As a textural class, soil that is 85 percent or more sand and not more than 10 percent clay.

Series, soil. A group of soils having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Slope classes. The slope classes used in this report are:

	Percent slope
Level	0 to 1
Nearly level	1 to 3
Gently sloping	3 to 8
Sloping	8 to 12
Moderately steep	12 to 20
Steep	More than 20

Soil. A natural, three-dimensional body on the earth's surface that supports plants. Soil has properties resulting from the integrated effect of climate and living matter acting upon parent material, as conditioned by relief, over periods of time.

Soil separates. Mineral particles, less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows; *Very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millimeter). The separates recognized by the International Society of Soil Science are as follows: I (2.0 millimeters to 0.2 millimeter); II (0.2 to 0.02 millimeter); III (0.02 to 0.002 millimeter); IV (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Stripcropping. The practice of growing crops in a systematic arrangement of strips, or bands, to serve as vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the profile below plow depth.

Substratum. Any layer beneath the solum or true soil.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace, agricultural. An embankment or ridge constructed across sloping soils on the contour or at slight angle to the contour. The terrace intercepts runoff and holds it for soaking into the soil or directs the excess water to an outlet.

Terrace, geological. An old alluvial plain, often called a second bottom, that now lies above the present first bottom as a result of entrenchment of the stream; seldom subject to flooding.

Texture, soil. The relative proportion of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Type, soil. A subdivision of a soil series, made on the basis of differences in the texture of the surface layer.

Upland, geologic. Land consisting of material not worked by water within recent geologic time, generally lying at a higher elevation than the bottom lands and stream terraces.

Water table. The upper limit of the part of the soil or underlying rock material that is wholly saturated with water. (See also *Perched water table.*)

Wilting point. The moisture content at which the soil contains so little water that a plant can no longer extract any for its own use.

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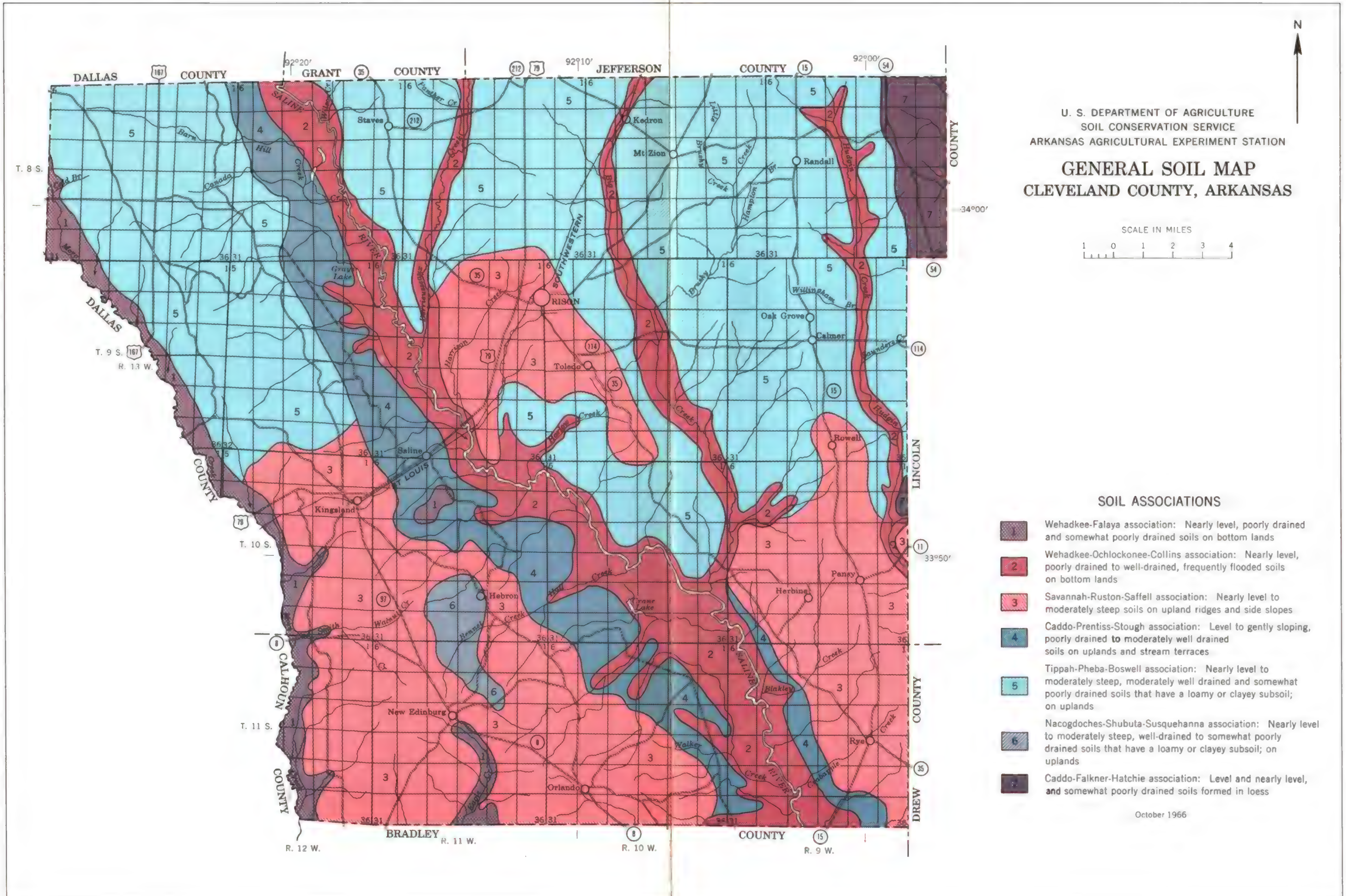
GUIDE TO MAPPING UNITS

[For a full description of a mapping unit, read both the description of the mapping unit and the description of the soil series to which the mapping unit belongs.

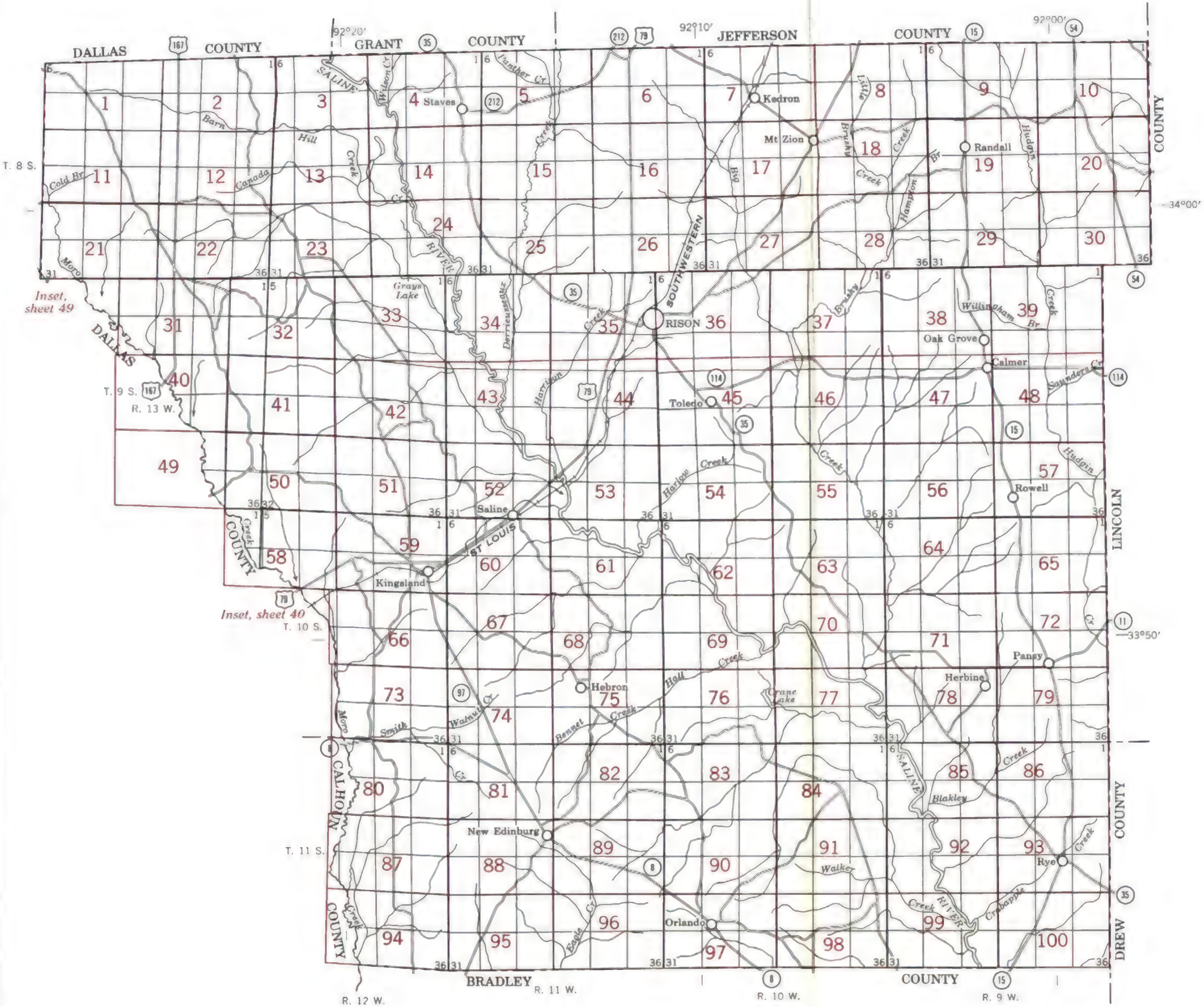
[See table 1, p. 5, for approximate acreage and proportionate extent of the soils. See table 2, p. 23, for estimated average acre yields of the major crops. See the section beginning on p. 34 for information on engineering properties of the soils]

Symbol	Soil	Described on page	Capability unit		Woodland suitability group		Wildlife suitability group	
			Symbol	Page	Number	Page	Number	Page
AmB	Amagon silt loam, heavy substratum, 0 to 3 percent slopes	4	IIIw-2	21	8	29	5	33
AmC	Amagon silt loam, heavy substratum, 3 to 8 percent slopes	4	IIIe-1	20	8	29	5	33
AnA	Angie silt loam, 0 to 1 percent slopes	4	IIIw-2	21	8	29	2	33
AnB	Angie silt loam, 1 to 3 percent slopes	5	IIIe-1	20	8	29	2	33
BoB2	Boswell loam, 1 to 3 percent slopes, eroded	6	IIIe-1	20	8	29	2	33
BoC2	Boswell loam, 3 to 8 percent slopes, eroded	6	IVe-1	21	8	29	2	33
BoE2	Boswell loam, 8 to 20 percent slopes, eroded	6	VIIe-1	22	12	30	2	33
BwB	Bowie fine sandy loam, 1 to 3 percent slopes	6	IIe-1	19	13	30	3	33
BwC	Bowie fine sandy loam, 3 to 8 percent slopes	6	IIIe-2	20	13	30	3	33
CaA	Caddo silt loam, 0 to 1 percent slopes	7	IIIw-1	21	6	29	1	32
CaB	Caddo silt loam, 1 to 3 percent slopes	7	IIIw-1	21	6	29	1	32
CbC2	Cahaba fine sandy loam, 3 to 8 percent slopes, eroded	7	IIIe-2	20	5	29	3	33
Co	Collins silt loam	7	I-1	19	1	27	1	32
Fa	Falaya silt loam	8	Vw-1	22	3	28	1	32
FkA	Falkner silt loam, 0 to 1 percent slopes	8	IIIw-2	21	8	29	2	33
FkB2	Falkner silt loam, 1 to 3 percent slopes, eroded	8	IIIw-2	21	8	29	2	33
Gp	Gravel pits	8	VIIe-1	22	16	30	3	33
HaB	Hatchie silt loam, 1 to 3 percent slopes	9	IIw-1	20	6	29	4	33
La	Lafe silt loam	9	VIs-1	22	18	31	5	33
NaC2	Nacogdoches gravelly loam, 2 to 8 percent slopes, eroded	9	IIIe-2	20	15	30	2	33
Oc	Ochlockonee very fine sandy loam	10	I-1	19	2	28	1	32
Ow	Ochlockonee-Wehadkee association	10	---	--	--	--	--	--
	Ochlockonee soil	--	Vw-1	22	2	28	1	32
	Wehadkee soil	--	VIw-1	22	2	28	1	32
PeA	Pheba very fine sandy loam, 0 to 1 percent slopes	10	IIIw-1	21	6	29	4	33
PeB	Pheba very fine sandy loam, 1 to 3 percent slopes	10	IIIw-1	21	6	29	4	33
PrB	Prentiss very fine sandy loam, 1 to 3 percent slopes	11	IIe-2	19	7	29	3	33
PrC	Prentiss very fine sandy loam, 3 to 8 percent slopes	11	IIIe-4	20	7	29	3	33
RuC	Ruston fine sandy loam, 3 to 8 percent slopes	11	IIIe-2	20	13	30	3	33
RuC2	Ruston fine sandy loam, 3 to 8 percent slopes, eroded	11	IIIe-2	20	13	30	3	33
SaC	Saffell gravelly fine sandy loam, 3 to 8 percent slopes	12	IIIe-2	20	14	30	3	33
SaE	Saffell gravelly fine sandy loam, 8 to 25 percent slopes	12	VIIe-1	22	14	30	3	33
ShB	Savannah very fine sandy loam, 1 to 3 percent slopes	12	IIe-2	19	13	30	3	33
ShC	Savannah very fine sandy loam, 3 to 8 percent slopes	13	IIIe-4	20	13	30	3	33
ShD2	Savannah very fine sandy loam, 8 to 12 percent slopes, eroded	13	IVe-2	21	13	30	3	33
SmC	Shubuta fine sandy loam, 3 to 8 percent slopes	13	IIIe-1	20	8	29	2	33
SmC2	Shubuta fine sandy loam, 3 to 8 percent slopes, eroded	14	IIIe-1	20	8	29	2	33
SmD	Shubuta fine sandy loam, 8 to 12 percent slopes	14	IVe-1	21	11	30	2	33
SnC2	Shubuta gravelly fine sandy loam, 3 to 8 percent slopes, eroded	14	IIIe-1	20	8	29	2	33
SnE	Shubuta gravelly fine sandy loam, 8 to 20 percent slopes	14	VIe-1	22	12	30	2	33
StB	Stough silt loam, 1 to 3 percent slopes	14	IIIw-1	21	7	29	4	33
StC	Stough silt loam, 3 to 8 percent slopes	14	IIIe-3	20	7	29	4	33
SuA	Susquehanna silty clay, 0 to 1 percent slopes	15	IVs-1	21	9	29	5	33
SuB	Susquehanna silty clay, 1 to 3 percent slopes	15	IIIe-1	20	9	29	5	33
SvA	Susquehanna very fine sandy loam, 0 to 1 percent slopes	15	IVs-1	21	9	29	5	33
SvB2	Susquehanna very fine sandy loam, 1 to 3 percent slopes, eroded	15	IVe-1	21	9	29	5	33
SvC2	Susquehanna very fine sandy loam, 3 to 8 percent slopes, eroded	15	VIe-1	22	9	29	5	33
SvE	Susquehanna very fine sandy loam, 8 to 25 percent slopes	15	VIIe-1	22	10	30	5	33
TaA	Tippah silt loam, 0 to 1 percent slopes	16	IIw-1	20	8	29	2	33
TaB2	Tippah silt loam, 1 to 3 percent slopes, eroded	16	IIe-1	19	8	29	2	33
TaC2	Tippah silt loam, 3 to 8 percent slopes, eroded	16	IIIe-1	20	8	29	2	33
TaC3	Tippah silt loam, 3 to 8 percent slopes, severely eroded	16	IVe-1	21	17	31	2	33
TaE	Tippah silt loam, 8 to 20 percent slopes	16	VIe-1	22	12	30	2	33
Wa	Wehadkee silt loam	17	Vw-1	22	4	28	1	32
Wb	Wehadkee soils and Local alluvium	17	VIw-1	22	4	28	1	32
Wc	Wehadkee-Caddo association	17	-----	--	--	--	--	--
	Wehadkee soil	--	VIw-1	22	4	28	1	32
	Caddo soil	--	IIIw-1	21	4	28	1	32
Wf	Wehadkee-Falaya association	17	------	--	--	--	--	--
	Wehadkee soil	--	VIw-1	22	4	28	1	32
	Falaya soil	--	Vw-1	22	4	28	1	32
WsA	Weston fine sandy loam, 0 to 1 percent slopes	17	IIIw-1	21	6	29	4	33
WsB	Weston fine sandy loam, 1 to 3 percent slopes	17	IIIw-1	21	6	29	4	33

242-836 O - 68 (Face p. 66)


U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ARKANSAS AGRICULTURAL EXPERIMENT STATION
GENERAL SOIL MAP
CLEVELAND COUNTY, ARKANSAS
SCALE IN MILES
1 0 1 2 3 4
N
SOIL ASSOCIATIONS
1 Wehadkee-Falaya association: Nearly level, poorly drained and somewhat poorly drained soils on bottom lands
2 Wehadkee-Ochlockonee-Collins association: Nearly level, poorly drained to well-drained, frequently flooded soils on bottom lands
3 Savannah-Ruston-Saffell association: Nearly level to moderately steep soils on upland ridges and side slopes
4 Caddo-Prentiss-Stough association: Level to gently sloping, poorly drained to moderately well drained soils on uplands and stream terraces
5 Tippah-Pheba-Boswell association: Nearly level to moderately steep, moderately well drained and somewhat poorly drained soils that have a loamy or clayey subsoil; on uplands
6 Nacogdoches-Shubuta-Susquehanna association: Nearly level to moderately steep, well-drained to somewhat poorly drained soils that have a loamy or clayey subsoil; on uplands
7 Caddo-Falkner-Hatchie association: Level and nearly level, and somewhat poorly drained soils formed in loess
October 1966
DALLAS COUNTY
GRANT COUNTY
JEFFERSON COUNTY
LINCOLN COUNTY
DREW COUNTY
BRADLEY COUNTY
CALHOUN COUNTY
92°20′
92°10′
92°00′
34°00′
33°50′
T. 8 S.
T. 9 S.
T. 10 S.
T. 11 S.
R. 13 W.
R. 12 W.
R. 11 W.
R. 10 W.
R. 9 W.
RISON
Staves
Kedron
Mt Zion
Randall
Toledo
Oak Grove
Calmer
Rowell
Saline
Kingsland
Hebron
Herbine
Pansy
New Edinburg
Orlando
Rye
SALINE RIVER
ST LOUIS SOUTHWESTERN
Gray Lake
Crane Lake

INDEX TO MAP SHEETS
CLEVELAND COUNTY, ARKANSAS



SOIL LEGEND

Each soil symbol consists of letters or a combination of letters and numbers. If a soil symbol contains three letters, the third letter, a capital, shows the class of slope and is given wherever slope forms part of the soil name. Some of the soils or land types that lack a slope symbol are nearly level, but others, such as Gullied land, have a range of slope. A final number, 2 or 3, in a symbol shows that the soil is named as eroded or severely eroded.

SYMBOL	NAME
AmB	Amagon silt loam, heavy substratum, 0 to 3 percent slopes
AmC	Amagon silt loam, heavy substratum, 3 to 8 percent slopes
AnA	Angie silt loam, 0 to 1 percent slopes
AnB	Angie silt loam, 1 to 3 percent slopes
BoB2	Boswell loam, 1 to 3 percent slopes, eroded
BoC2	Boswell loam, 3 to 8 percent slopes, eroded
BoE2	Boswell loam, 8 to 20 percent slopes, eroded
BwB	Bowie fine sandy loam, 1 to 3 percent slopes
BwC	Bowie fine sandy loam, 3 to 8 percent slopes
CaA	Caddo silt loam, 0 to 1 percent slopes
CaB	Caddo silt loam, 1 to 3 percent slopes
CbC2	Cahaba fine sandy loam, 3 to 8 percent slopes, eroded
Co	Collins silt loam
Fa	Falaya silt loam
FkA	Falkner silt loam, 0 to 1 percent slopes
FkB2	Falkner silt loam, 1 to 3 percent slopes, eroded
Gp	Gravel pits
HaB	Harchie silt loam, 1 to 3 percent slopes
La	Lafe silt loam
NaC2	Nacogdoches gravelly loam, 2 to 8 percent slopes, eroded
Oc	Ochlockonee very fine sandy loam
Ow	Ochlockonee–Wehadkee association
PeA	Pheba very fine sandy loam, 0 to 1 percent slopes
PeB	Pheba very fine sandy loam, 1 to 3 percent slopes
PrB	Prentiss very fine sandy loam, 1 to 3 percent slopes
PrC	Prentiss very fine sandy loam, 3 to 8 percent slopes
RuC	Ruston fine sandy loam, 3 to 8 percent slopes
RuC2	Ruston fine sandy loam, 3 to 8 percent slopes, eroded
SaC	Saffell gravelly fine sandy loam, 3 to 8 percent slopes
SaE	Saffell gravelly fine sandy loam, 8 to 25 percent slopes
ShB	Savannah very fine sandy loam, 1 to 3 percent slopes
ShC	Savannah very fine sandy loam, 3 to 8 percent slopes
ShD2	Savannah very fine sandy loam, 8 to 12 percent slopes, eroded
SmC	Shubuta fine sandy loam, 3 to 8 percent slopes
SmC2	Shubuta fine sandy loam, 3 to 8 percent slopes, eroded
SmD	Shubuta fine sandy loam, 8 to 12 percent slopes
SnC2	Shubuta gravelly fine sandy loam, 3 to 8 percent slopes, eroded
SnE	Shubuta gravelly fine sandy loam, 8 to 20 percent slopes
StB	Stough silt loam, 1 to 3 percent slopes
StC	Stough silt loam, 3 to 8 percent slopes
SuA	Susquehanna silty clay, 0 to 1 percent slopes
SuB	Susquehanna silty clay, 1 to 3 percent slopes
SvA	Susquehanna very fine sandy loam, 0 to 1 percent slopes
SvB2	Susquehanna very fine sandy loam, 1 to 3 percent slopes, eroded
SvC2	Susquehanna very fine sandy loam, 3 to 8 percent slopes, eroded
SvE	Susquehanna very fine sandy loam, 8 to 25 percent slopes
TaA	Tippah silt loam, 0 to 1 percent slopes
TaB2	Tippah silt loam, 1 to 3 percent slopes, eroded
TaC2	Tippah silt loam, 3 to 8 percent slopes, eroded
TaC3	Tippah silt loam, 3 to 8 percent slopes, severely eroded
TaE	Tippah silt loam, 8 to 20 percent slopes
Wa	Wehadkee silt loam
Wb	Wehadkee soils and Local alluvium
Wc	Wehadkee–Caddo association
Wf	Wehadkee–Falaya association
WsA	Weston fine sandy loam, 0 to 1 percent slopes
WsB	Weston fine sandy loam, 1 to 3 percent slopes

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Dual
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferries
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
- School
- Church
- Station

Mines and Quarries
- Mine dump
- Pits, gravel or other

Power line

Pipeline

Cemeteries

Dams

Levee

Sawmill

Forest fire or lookout station

BOUNDARIES

- National or state
- County
- Township, U. S.
- Section line, corner
- Reservation
- Land grant

DRAINAGE

Streams
- Perennial
- Intermittent, unclassied

Canals and ditches (CANAL / DITCH)

Lakes and ponds
- Perennial
- Intermittent

Wells (flowing)

Springs

Marsh

Wet spot

Alluvial fan

Drainage end

RELIEF

Escarpments
- Bedrock
- Other

Prominent peaks

Depressions

	Large	Small
Crossable with tillage implements		
Not crossable with tillage implements		
Contains water most of the time		

SOIL SURVEY DATA

- Soil boundary and symbol (Dx)
- Gravel
- Stones
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully

Soil map constructed 1966 by Cartographic Division, Soil Conservation Service, USDA, from 1956 aerial photographs. Controlled mosaic based on Arkansas plane coordinate system, south zone, Lambert conformal conic projection, 1927 North American datum.

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 1

(1)

N

This map is one of a set compiled in 1956 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

(Joins sheet 2)

(Joins sheet 11)

0 ½ Mile Scale 1:15 840 0 3000 Feet

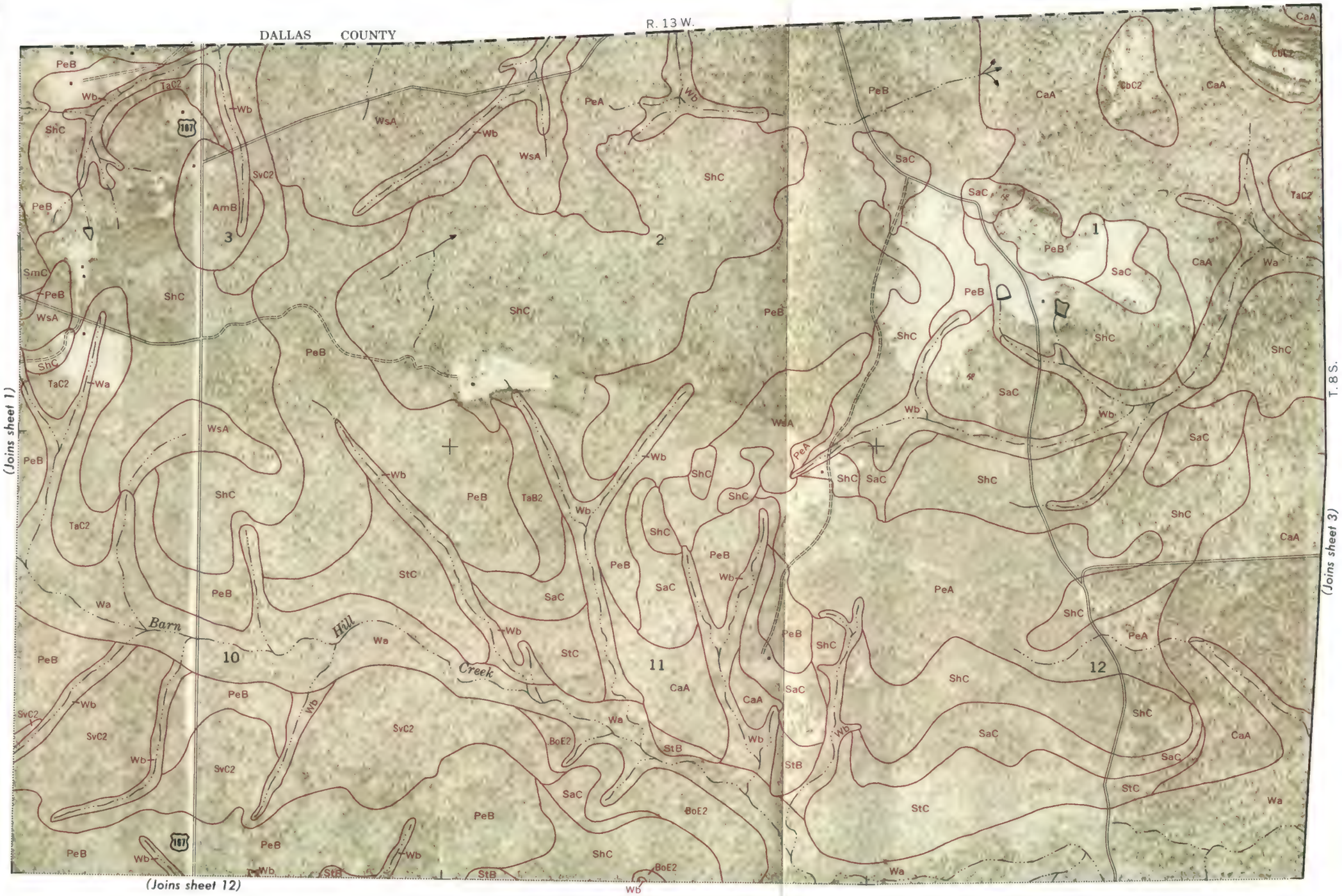
(2)

N

DALLAS COUNTY

R. 13 W.

T. 8 S.



(Joins sheet 1)

(Joins sheet 3)

(Joins sheet 12)

0 ½ Mile Scale 1:15 840 0 3000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite.

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

N

GRANT COUNTY

R. 12 W.

T. 8 S.

Black Church

Staves

CEMETERY

White Oak Bluff

Wilson Creek

SALINE RIVER

(Joins sheet 3)

(Joins sheet 5)

(Joins sheet 14)

0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite.

6

N

JEFFERSON COUNTY

R. 11 W.

T. 8 S.

(Joins sheet 5)

(Joins sheet 7)

(Joins sheet 16)

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

N

JEFFERSON COUNTY

R. 10 W.

T. 8 S.

0 ½ Mile Scale 1:15 840 0 3000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet

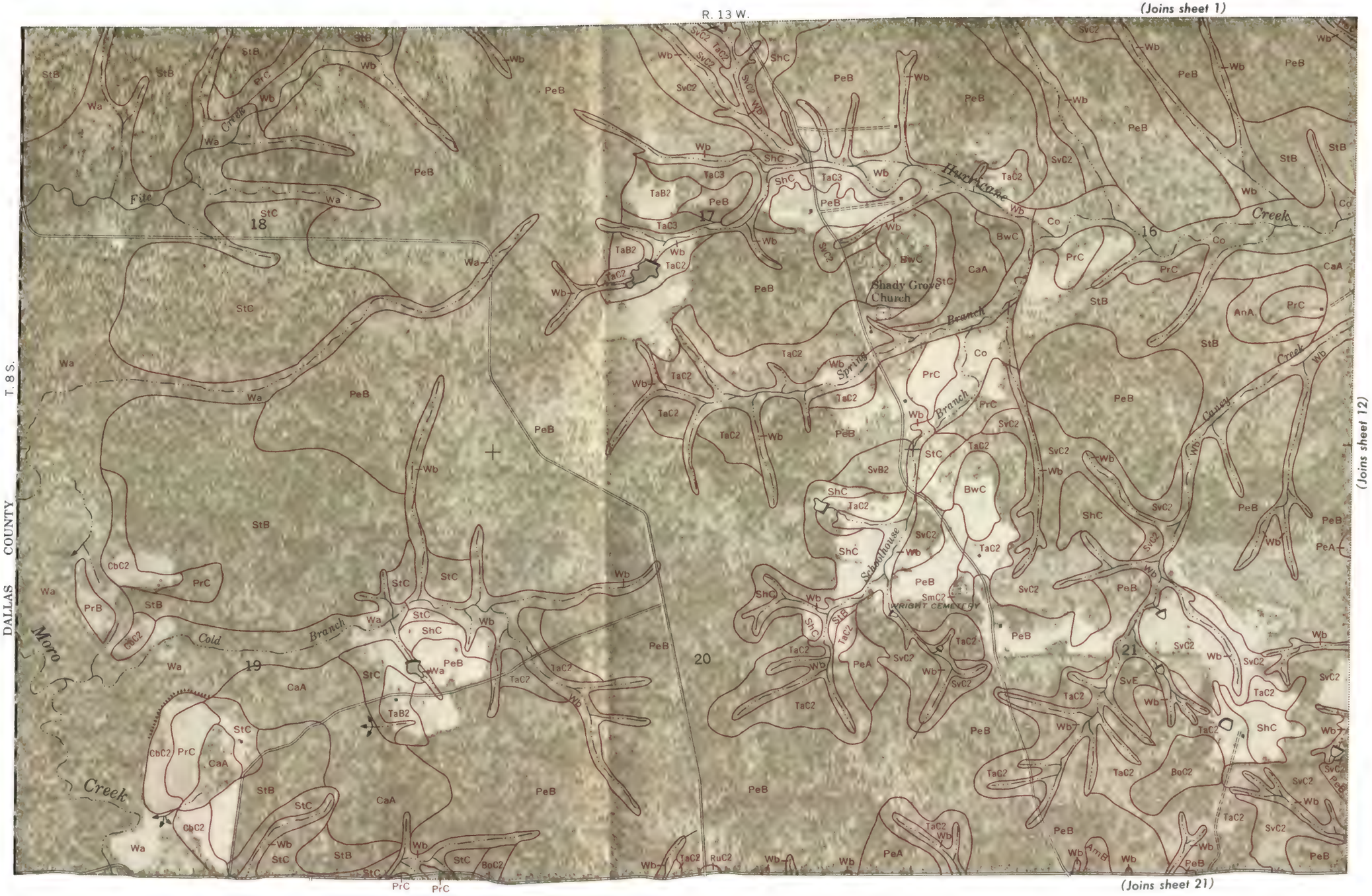

N
R. 9 W.
JEFFERSON COUNTY
LINCOLN COUNTY
T. 8 S.
(Joins sheet 9)
(Joins sheet 20)
CaA
TaB2
SvB2
Wb
ShB
TaA
SvC2
HaB
StC
ShC
PrB
PrC
BoC2
CbC2
TaB2
BwB
PeB
FkA
FkB2
SvA
TaC2
BoE2
Wbj
1
2
3
10
11
12
0
½ Mile
Scale 1:15 840
0
3000 Feet

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 11

11

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.



0 ½ Mile Scale 1:15 840 0 3000 Feet

N

0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite.

(14)


N
(Joins sheet 4)
R. 12 W.
T. 8 S.
(Joins sheet 13)
(Joins sheet 15)
(Joins sheet 24)
Upper Canada Lake
Lower Canada Lake
SALINE RIVER
WILSON CEMETERY
MAHONEY FERRY ROAD
White Oak Bluff
15
14
13
22
23
24
0
½ Mile
Scale 1:15 840
0
3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

16

N

R. 11 W.

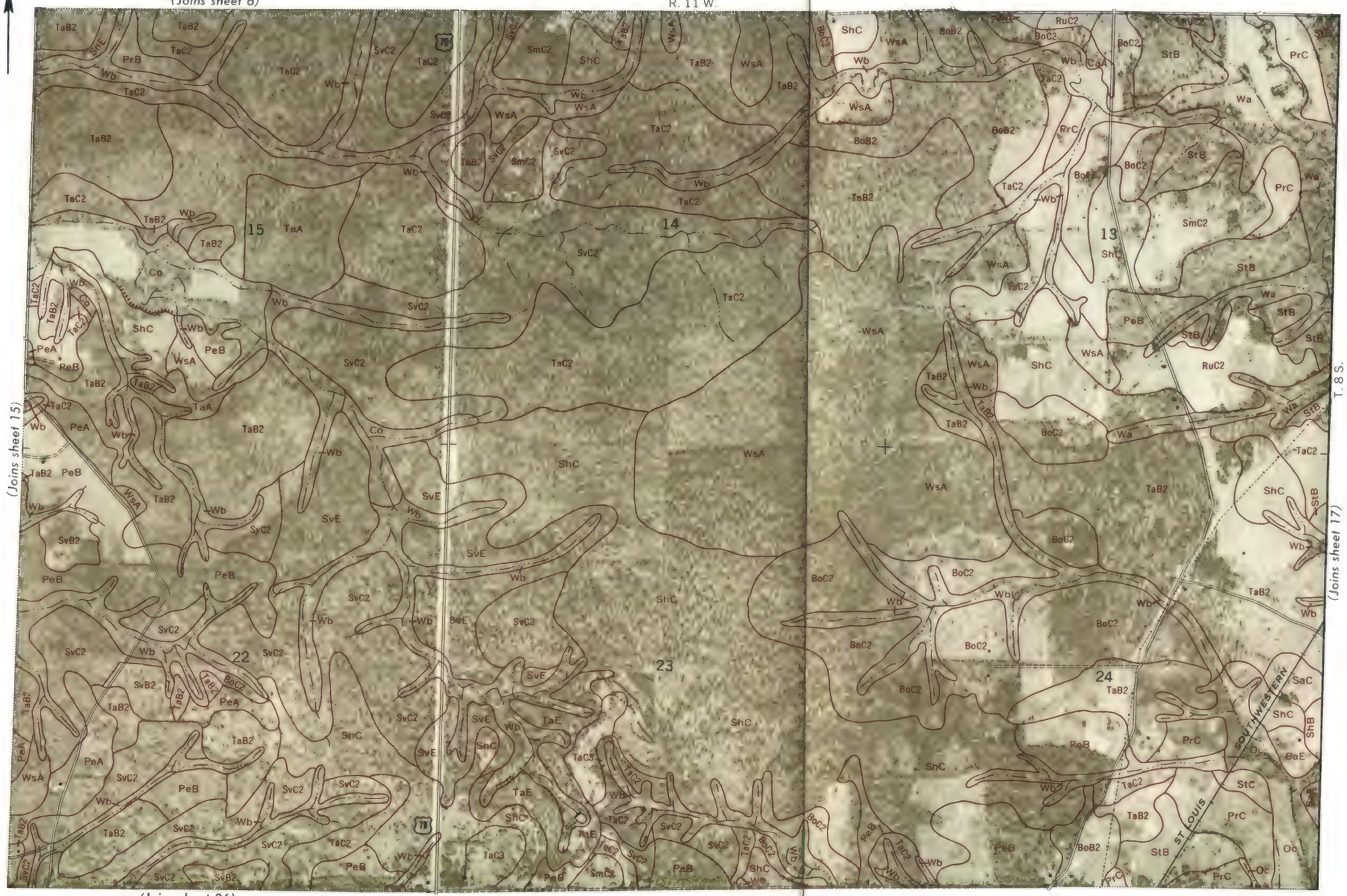
T. 8 S.

(Joins sheet 6)

(Joins sheet 15)

(Joins sheet 17)

(Joins sheet 26)



0 ½ Mile Scale 1:15 840 0 3000 Feet

N

R. 10 W.

T. 8 S.

(Joins sheet 8)

(Joins sheet 17)

(Joins sheet 19)

(Joins sheet 28)

0 ½ Mile Scale 1:15 840 0 3000 Feet

Range: township, and section corners shown on this map are indefinite.

0 ½ Mile Scale 1:15 840 0 3000 Feet

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 20

20

N

(Joins sheet 10)

R. 9 W.

New Home Church

(Joins sheet 19)

T. 8 S.

LINCOLN COUNTY

(Joins sheet 30)

0 ½ Mile Scale 1:15 840 0 3000 Feet

N

(Joins sheet 12)

R. 13 W.

(Joins sheet 21)

(Joins sheet 23)

T. 8 S.

Crenk School

MT COMMON CEMETERY

New Friendship Church

(Joins sheet 31) | (Joins sheet 32)

0 ½ Mile Scale 1:15 840 0 3000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite.


N
R. 12 W.
T. 8 S.
(Joins sheet 14)
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 33)
(Joins sheet 34)
Canada Creek
SALINE RIVER
Wilson Lake
26
27
35
34
36
25
Wf
Wa
Ow
Oc
Qw
Gp
StB
PrB
CaA
BoC2
BoE2
BoB2
TaB2
TaC2
TaD2
SaC
SaE
PrC
Wb
ShC
ShD2
SvC2
WsA
0
½ Mile
Scale 1:15 840
0
3000 Feet

Range, township, and section corners shown on this map are indefinite.

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station

Range, township, and section corners shown on this map are indefinite.

N

R. 10 W.

(Joins sheet 17)

T. 8 S.

(Joins sheet 26)

(Joins sheet 28)

(Joins sheet 36) | (Joins sheet 37)

0 ½ Mile Scale 1:15 840 0 3000 Feet

N

(Joins sheet 18)

R. 10 W.

T. 8 S.

(Joins sheet 27)

(Joins sheet 29)

(Joins sheet 37) | (Joins sheet 38)

Rowland School

Branch

Brumley

Hampton

Creek

0 ½ Mile Scale 1:15 840 0 3000 Feet

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 29

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

30

N

(Joins sheet 20)

R. 9 W.

(Joins sheet 29)

T. 8 S.

LINCOLN COUNTY

(Joins sheet 39) | LINCOLN COUNTY

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

0 ½ Mile Scale 1:15 840 0 3000 Feet

(32)

N

R. 13 W. | R. 12 W.

T. 9 S.

(Joins sheet 22)

(Joins sheet 23)

(Joins sheet 31)

(Joins sheet 33)

(Joins sheet 41)

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

(Joins sheet 23)

(Joins sheet 24)

R. 12 W.

N

T. 9 S.

(Joins sheet 32)

(Joins sheet 34)

(Joins sheet 42)

Grays Lake

StB CaA Wa PrC SaC ShC RuC2 WsA Wb SnC PeA PeB CbC2 Wf Co

1 2 3 10 11 12

0 ½ Mile Scale 1:15 840 0 3000 Feet

(Joins sheet 24)

(Joins sheet 25)

R. 11 W.

T. 9 S.

N

(Joins sheet 33)

(Joins sheet 35)

(Joins sheet 43)

0 ½ Mile Scale 1:15 840 0 3000 Feet

(Joins sheet 25) | (Joins sheet 26)

R. 11 W.

T. 9 S.

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

(Joins sheet 26) | (Joins sheet 27)

R. 10 W.

T. 9 S.

N

SOUTHWESTERN

ST LOUIS

RISON

Big Creek

(Joins sheet 35)

(Joins sheet 37)

(Joins sheet 45)

0 ½ Mile Scale 1:15 840 0 3000 Feet

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 37

(Joins sheet 27) (Joins sheet 28) R. 10 W.

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

38


(Joins sheet 28)
(Joins sheet 29)
R. 9 W.
T. 9 S.
N
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 47)
Woodlawn School
Willingham
Oak Grove
0 ½ Mile
Scale 1:15 840
0 3000 Feet

N

R. 13 W.

R. 12 W.

(Joins sheet 58)

(Joins sheet 31)

(Joins sheet 66)

(Joins sheet 41)

(Joins sheet 49)

DALLAS COUNTY

Moro Creek

ST LOUIS SOUTHWESTERN

T. 10 S.

T. 9 S.

15

16

14

22

23

Wa Fa TaC2 SvF CaA StC Wb StB 107

Co ShC SnC2 AmC SnC SvC2 PeB BoC2 SmC2 ReB PrC Wh

0 ½ Mile Scale 1:15 840 0 3000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet

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Range, township, and section corners shown on this map are indefinite.

N

R. 12 W.

T. 9 S.

(Joins sheet 33)

(Joins sheet 41)

(Joins sheet 43)

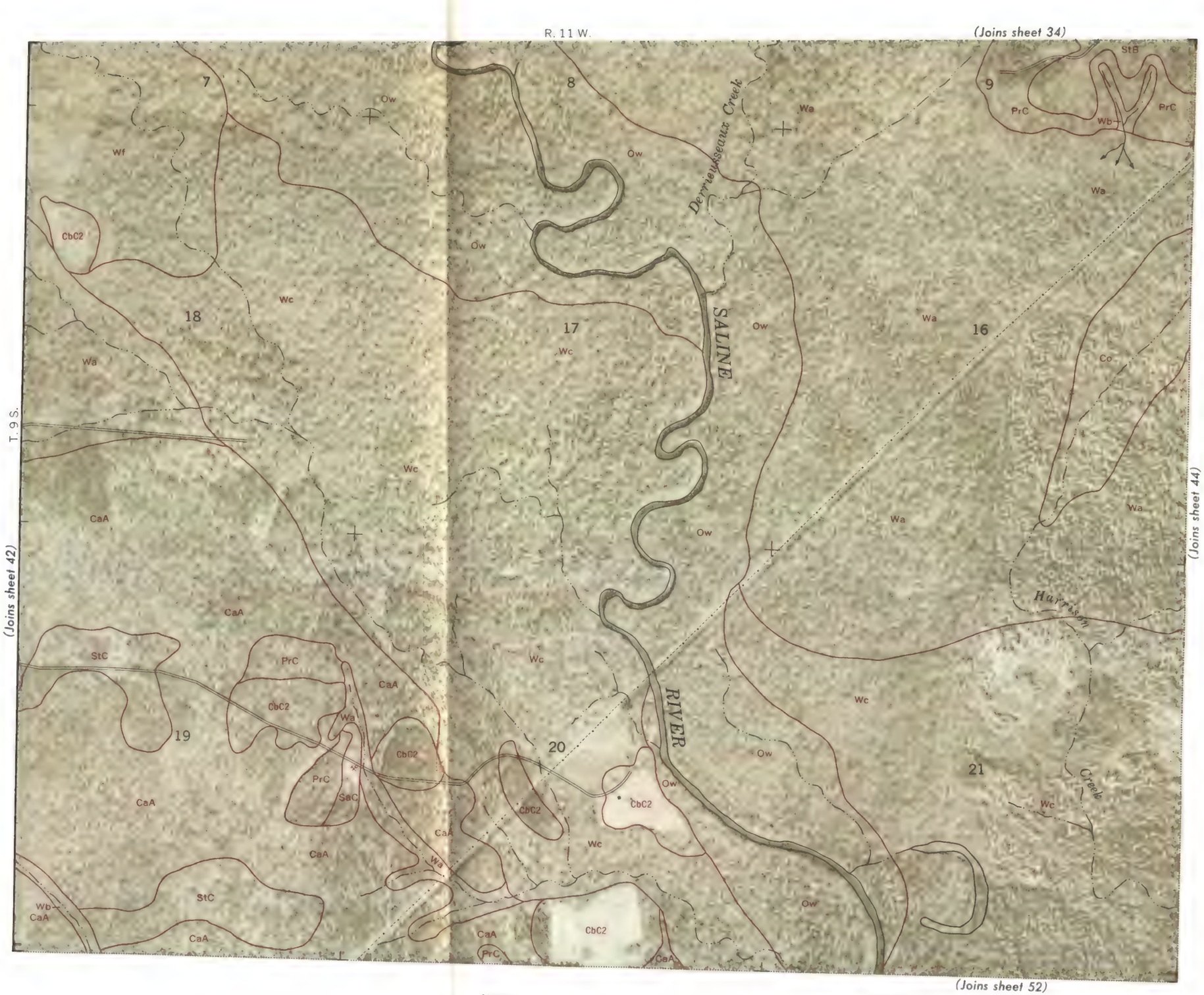
(Joins sheet 51)

10 11 12 13 14 15 22 23 24

HANEY CEMETERY

Crossroads Church

0 ½ Mile Scale 1:15 840 0 3000 Feet

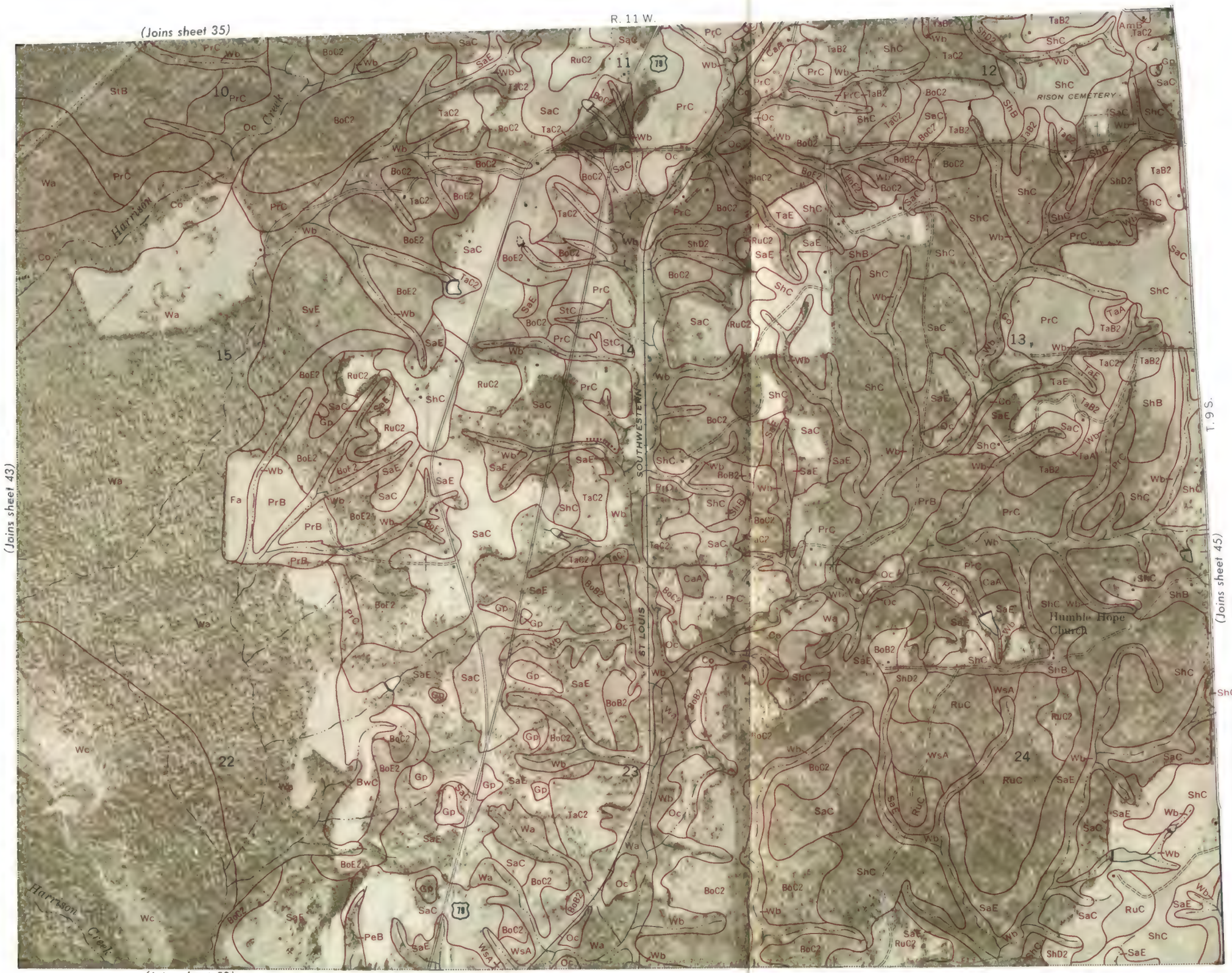


0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

(44)


N
R. 11 W.
T. 9 S.
(Joins sheet 35)
(Joins sheet 43)
(Joins sheet 45)
(Joins sheet 53)
SOUTHWESTERN
ST LOUIS
RISON CEMETERY
Humble Hope Church
Harrison Creek
Harrison Creek
10
11
12
13
14
15
22
23
24
78
StB
PrC
Wb
BoC2
TaC2
SaC
SaE
RuC2
Oc
Co
Wa
BoE2
SvE
StC
ShC
ShD2
TaB2
TaE
TaA
ShB
BoB2
BoF2
Gp
PrB
Fa
BwC
PeB
WsA
RuC
CaA
AmB
Wc
0
½ Mile
Scale 1:15 840
0
3000 Feet

Range, township, and section corners shown on this map are indefinite.

R. 10 W.

(Joins sheet 36)

T. 9 S.

(Joins sheet 44)

(Joins sheet 46)

(Joins sheet 54)

N

Toledo

Zion Church

VARNELL CEMETERY

HARLOW CEMETERY

LINDSEY CEMETERY

0 ½ Mile

Scale 1:15 840

0 3000 Feet

(Joins sheet 37)

R. 10 W.

T. 9 S.

N

Brushy Creek

Big Creek

New Hope Church

PALESTERRO CEMETERY

(Joins sheet 45)

(Joins sheet 47)

(Joins sheet 55)

0 ½ Mile Scale 1:15 840 0 3000 Feet

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 47

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

48

N

(Joins sheet 39)

R. 9 W.

(Joins sheet 47)

(Joins sheet 57)

T. 9 S.

LINCOLN COUNTY

Scale 1:15 840

0 ½ Mile

0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corner locations shown on this map are indefinite.

0 ½ Mile Scale 1:15 840 0 3000 Feet

(50)

N

0 ½ Mile Scale 1:15 840 0 3000 Feet

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 51

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

52

N

(Joins sheet 43)

R. 11 W.

(Joins sheet 51)

(Joins sheet 53)

T. 9 S.

(Joins sheet 60)

Saline

SALINE RIVER

SOUTHWESTERN

ST LOUIS

79

30 29 28 31 32 33

StC CaA Wb Wa PrC CbC2 Wc Ow StB Fa Oc Co PeB RuC2

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

54

N

(Joins sheet 45)

R. 10 W.

T. 9 S.

(Joins sheet 53)

(Joins sheet 55)

(Joins sheet 62)

Creek

Hurlow

Liberty Hill Church

CHERRY CEMETERY

30 29 28 31 32 33

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

56

N

R. 9 W.

T. 9 S.

(Joins sheet 47)

(Joins sheet 55)

(Joins sheet 57)

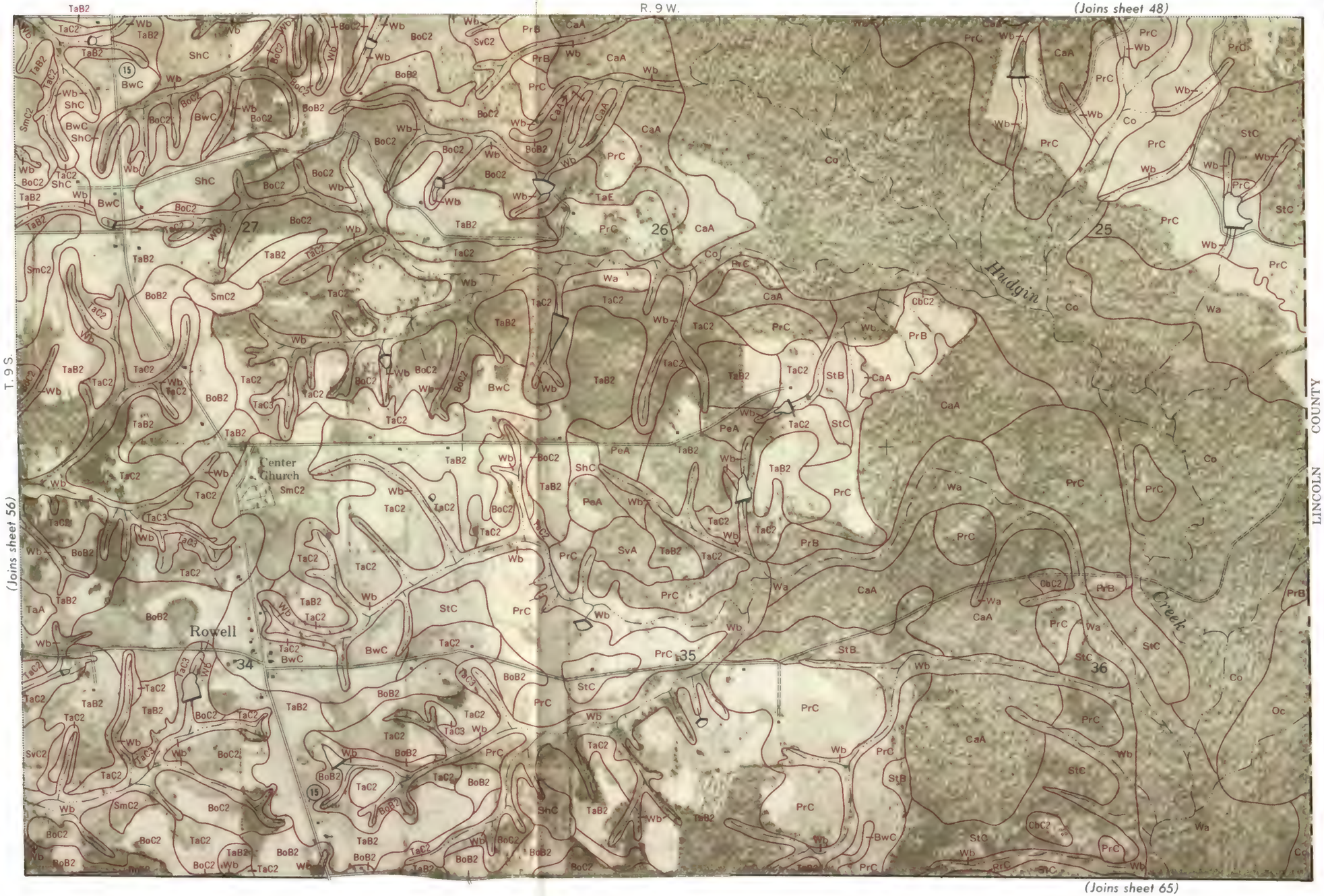
(Joins sheet 64)

30 29 28 31 32 33

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.



0 ½ Mile Scale 1:15 840 0 3000 Feet

58

N

R. 13 W. | R. 12 W.

T. 10 S.

(Joins sheet 50)

(Joins sheet 59)

(Joins inset, sheet 40) | (sheet 66)

Moro Creek

DALLAS COUNTY

Camp Springs Church

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

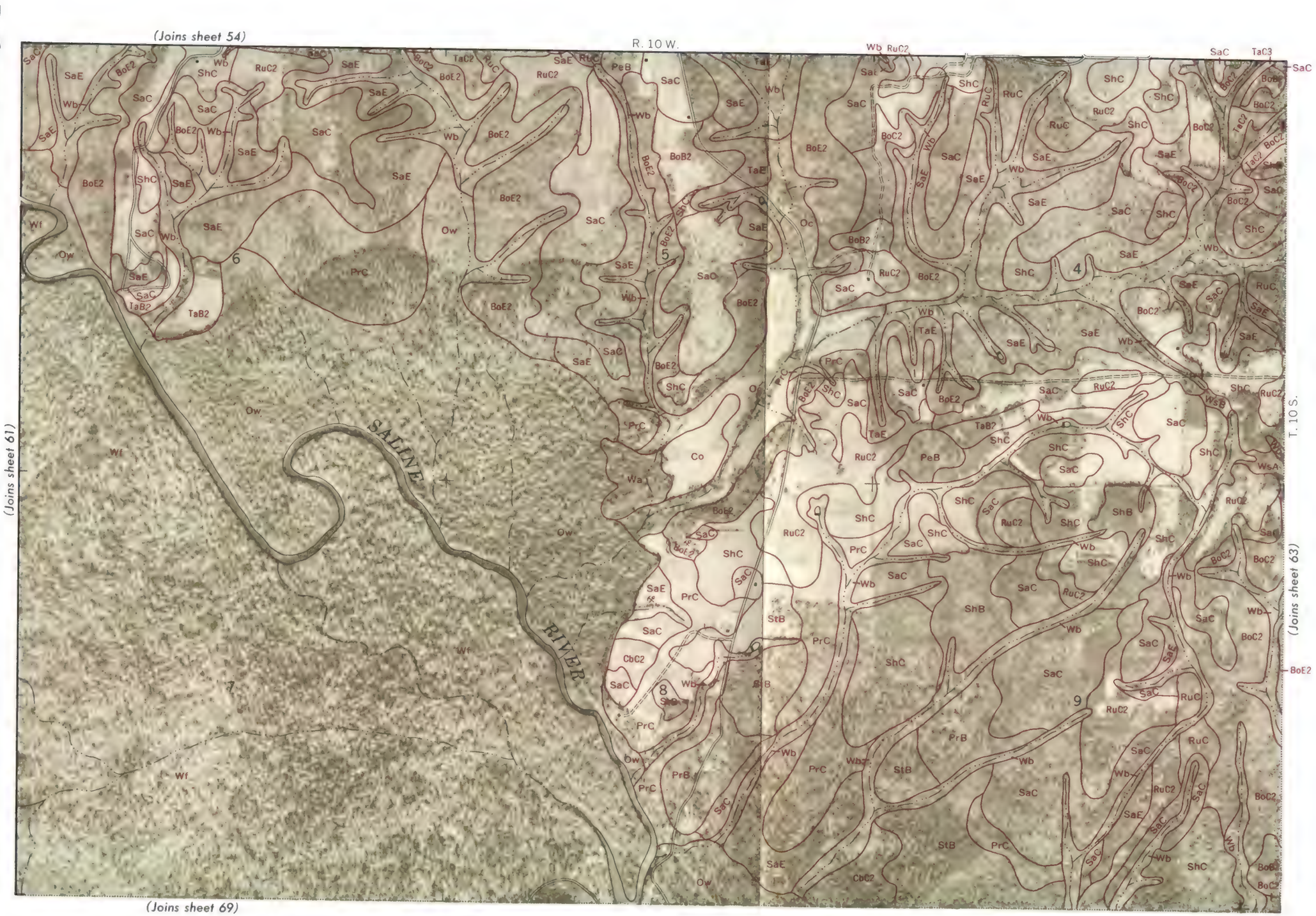
0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

0 ½ Mile Scale 1:15 840 0 3000 Feet

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 62



0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

N

(Joins sheet 56)

R. 9 W.

(Joins sheet 63)

(Joins sheet 65)

T. 10 S.

(Joins sheet 71)

Big Creek

0 ½ Mile Scale 1:15 840 0 3000 Feet

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 65

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station

Range, township, and section corners shown on this map are indefinite.

0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite.

0 ½ Mile Scale 1:15 840 0 3000 Feet

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 68

(68)

N

(Joins sheet 61)

R. 11 W.

T. 10 S.

(Joins sheet 67)

(Joins sheet 69)

(Joins sheet 75)

15 14 13 22 23 24

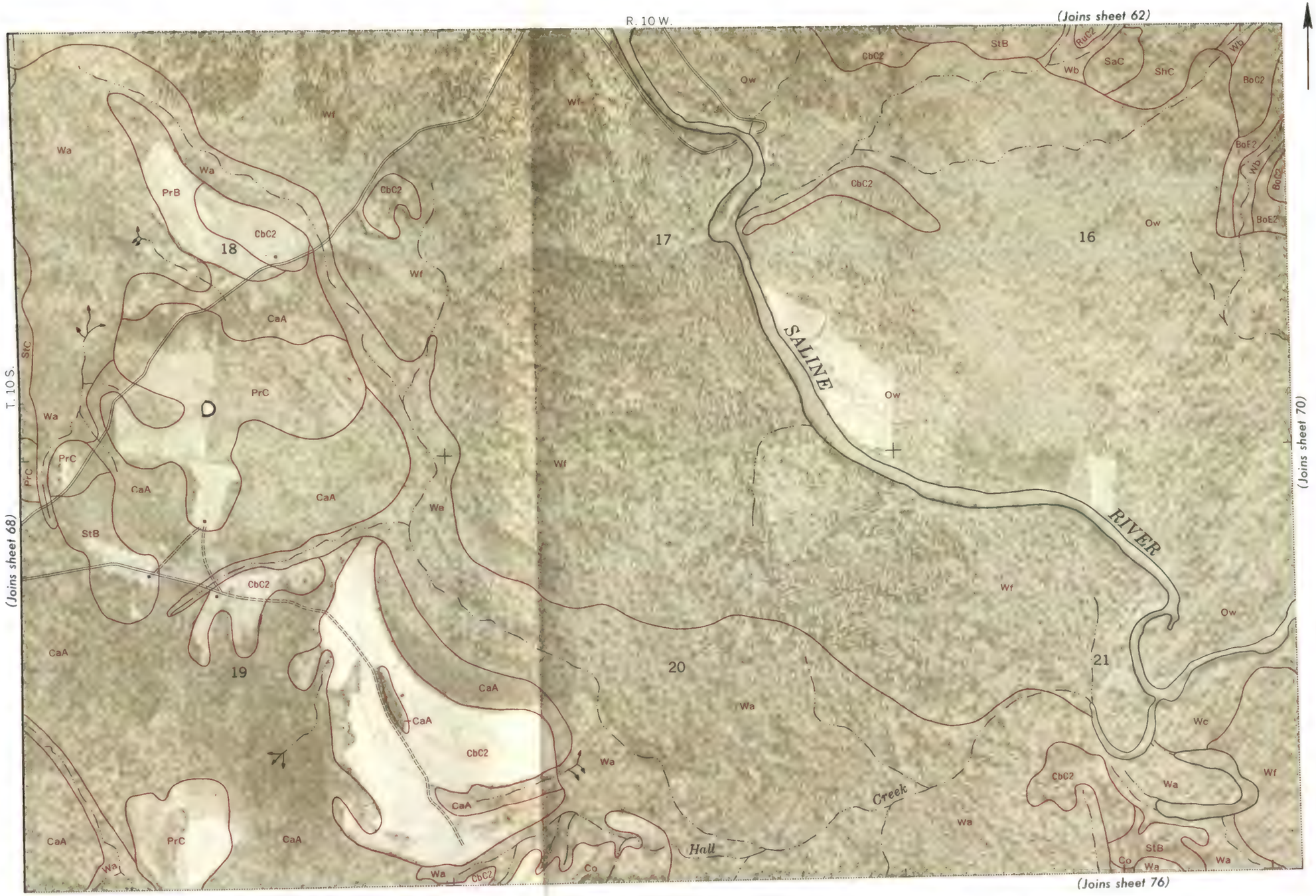
Wa Creek

Panther Creek

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.



0 ½ Mile Scale 1:15 840 0 3000 Feet


N
(Joins sheet 63)
R. 10 W.
T. 10 S.
(Joins sheet 69)
(Joins sheet 71)
(Joins sheet 77)
SALINE RIVER
Big Creek
15
14
13
22
23
24
35
BoC2
BoE2
TaB2
TaC2
PeB
StC
Wb
Wa
PrB
PrC
CbC2
StB
CaA
Wf
Co
Ow
Wc
SnE
ShC
ShB
Oc
0
½ Mile
Scale 1:15 840
0
3000 Feet

Range, township, and section corners shown on this map are indefinite.

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

0 ½ Mile Scale 1:15 840 0 3000 Feet

N

(Joins sheet 65)

R. 9 W.

T. 10 S.

(Joins sheet 71)

(Joins sheet 79)

LINCOLN COUNTY

Hudgin

Creek

Pansy

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.


N
(Joins sheet 67)
R. 11 W.
T. 10 S.
(Joins sheet 73)
(Joins sheet 75)
(Joins sheet 81)
30
29
28
31
32
33
Walnut Creek
0
½ Mile
Scale 1:15 840
0
3000 Feet

76

N

(Joins sheet 69)

R. 10 W.

T. 10 S.

(Joins sheet 75)

(Joins sheet 77)

(Joins sheet 83)

Creek

Herb

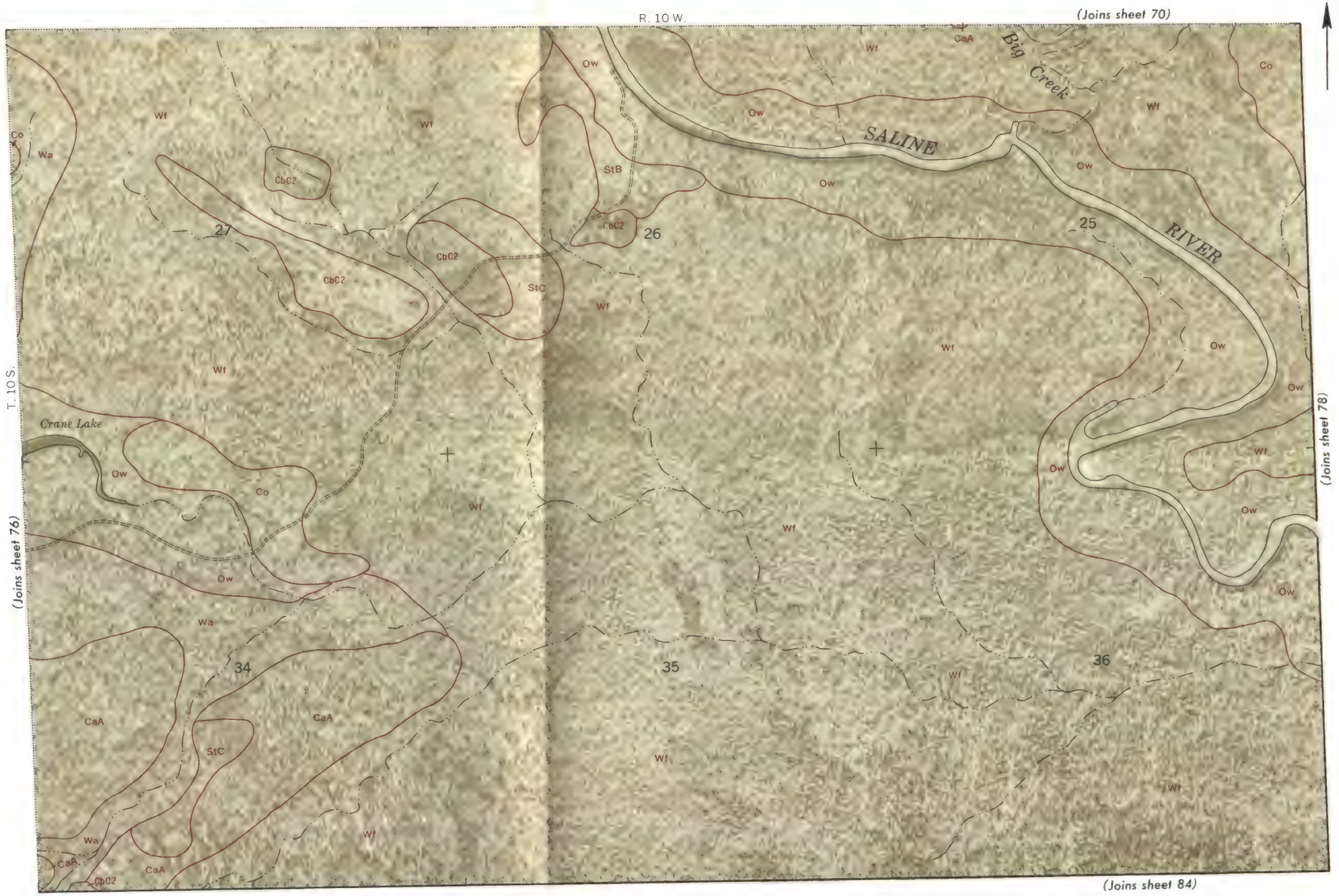
Crane Lake

30 29 28 31 32 33

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.



0 ½ Mile Scale 1:15 840 0 3000 Feet


N
R. 9 W.
T. 10 S.
(Joins sheet 71)
(Joins sheet 77)
(Joins sheet 79)
(Joins sheet 85)
Herbine
SALINE RIVER
30
29
28
31
32
33
0 ½ Mile
Scale 1:15 840
0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 82

82

N

R. 11 W.

T. 11 S.

(Joins sheet 75)

(Joins sheet 81)

(Joins sheet 83)

(Joins sheet 89)

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station

Range, township, and section corners shown on this map are indefinite.

84

N

(Joins sheet 77)

R. 10 W.

T. 11 S.

(Joins sheet 83)

(Joins sheet 85)

(Joins sheet 91)

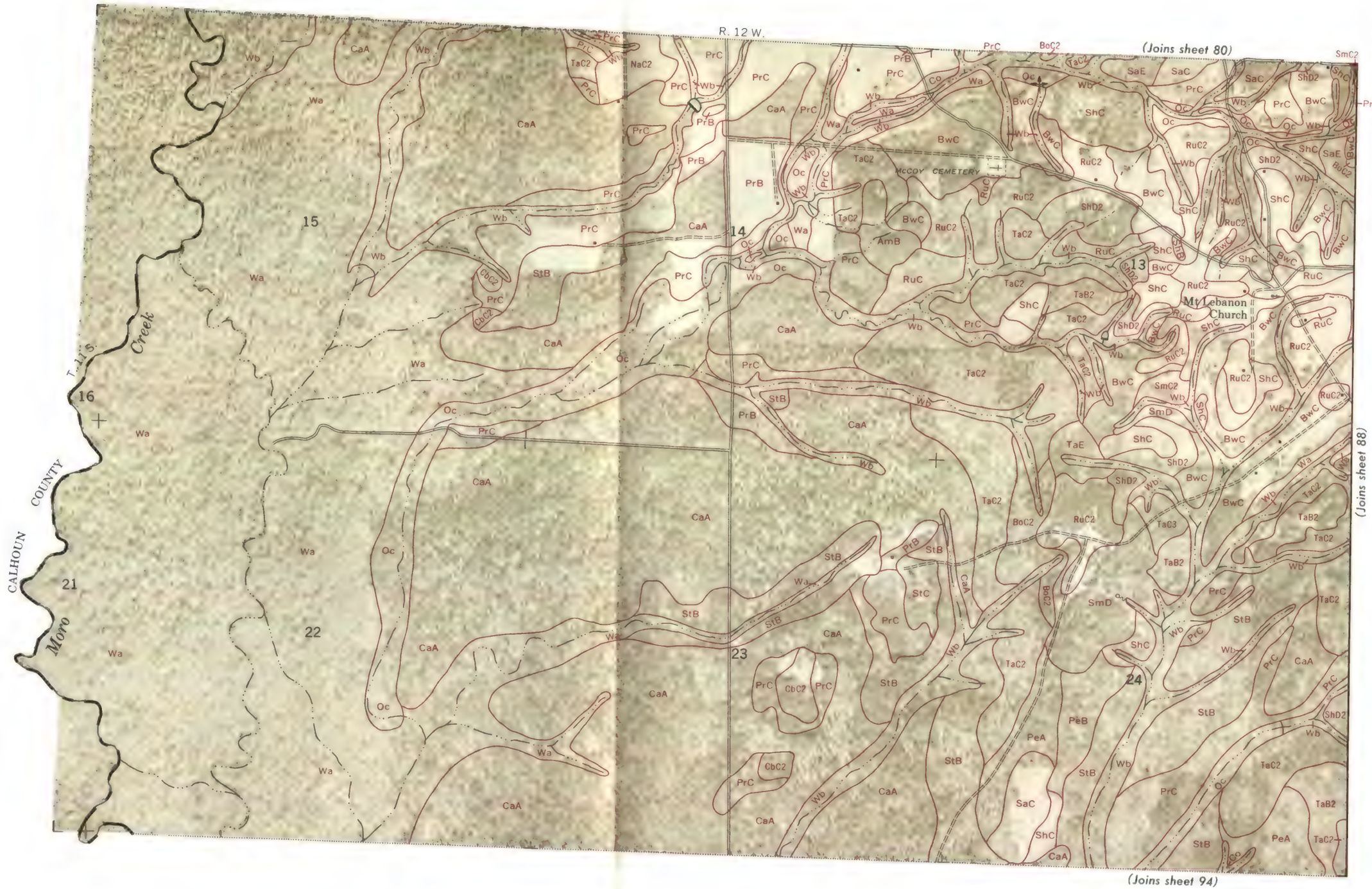
StC

0 ½ Mile Scale 1:15 840 0 3000 Feet

Range, township, and section corners shown on this map are indefinite.

N


(Joins sheet 79)
R. 9 W.
DREW COUNTY
T. 11 S.
(Joins sheet 85)
(Joins sheet 93)
Blakley Creek
SEARCY CEMETERY
1
2
3
10
11
12
13
15
35
SaC
ShD2
BoC2
Wb
PrC
TaB2
TaC2
Oc
BwC
RuC2
WsA
CbC2
CaB
BoB2
Wa
SaE
ShC
CaA
Co
SvB2
Wf
AnB
AnA
PrB
RuC
Gp
0
½ Mile
Scale 1:15 840
0
3000 Feet



0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

88

N

R. 11 W.

T. 11 S.

(Joins sheet 81)

(Joins sheet 87)

(Joins sheet 89)

(Joins sheet 95)

CRANE CEMETERY

NEW EDINBURG

WILSON CEMETERY

0 ½ Mile Scale 1:15 840 0 3000 Feet

0 ½ Mile Scale 1:15 840 0 3000 Feet

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 90

90

N

(Joins sheet 83)

R. 10 W.

T. 11 S.

(Joins sheet 89)

(Joins sheet 91)

(Joins sheet 97)

WARNER CEMETERY

REEVES CEMETERY

Macedonia Church

0 ½ Mile Scale 1:15 840 0 3000 Feet

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 91

N

R. 10 W.

T. 11 S.

(Joins sheet 84)

(Joins sheet 90)

(Joins sheet 92)

(Joins sheet 98)

Walker Creek

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

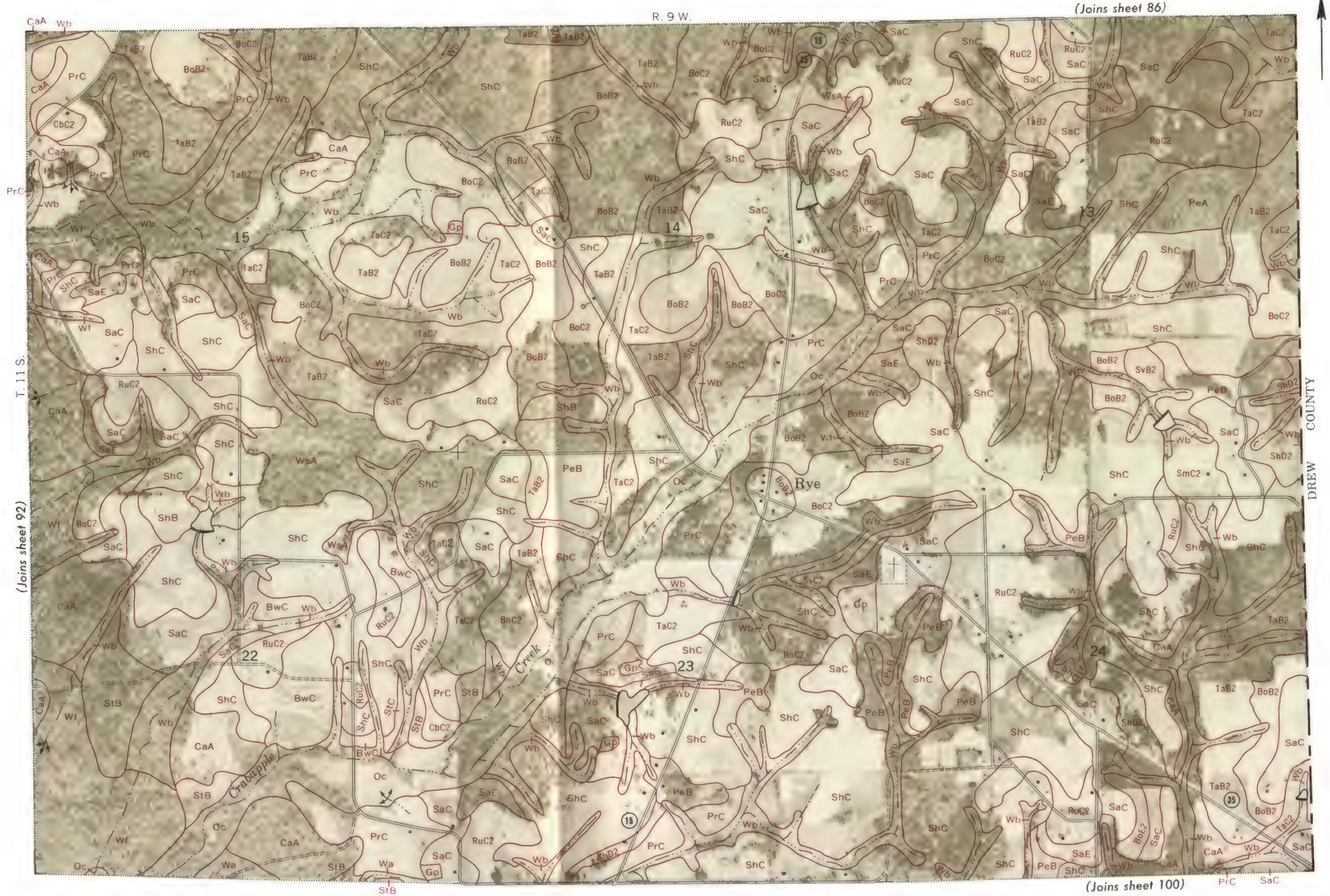
Range, township, and section corners shown on this map are indefinite.

92

N

0 ½ Mile Scale 1:15 840 0 3000 Feet

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 93



This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 94

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

N

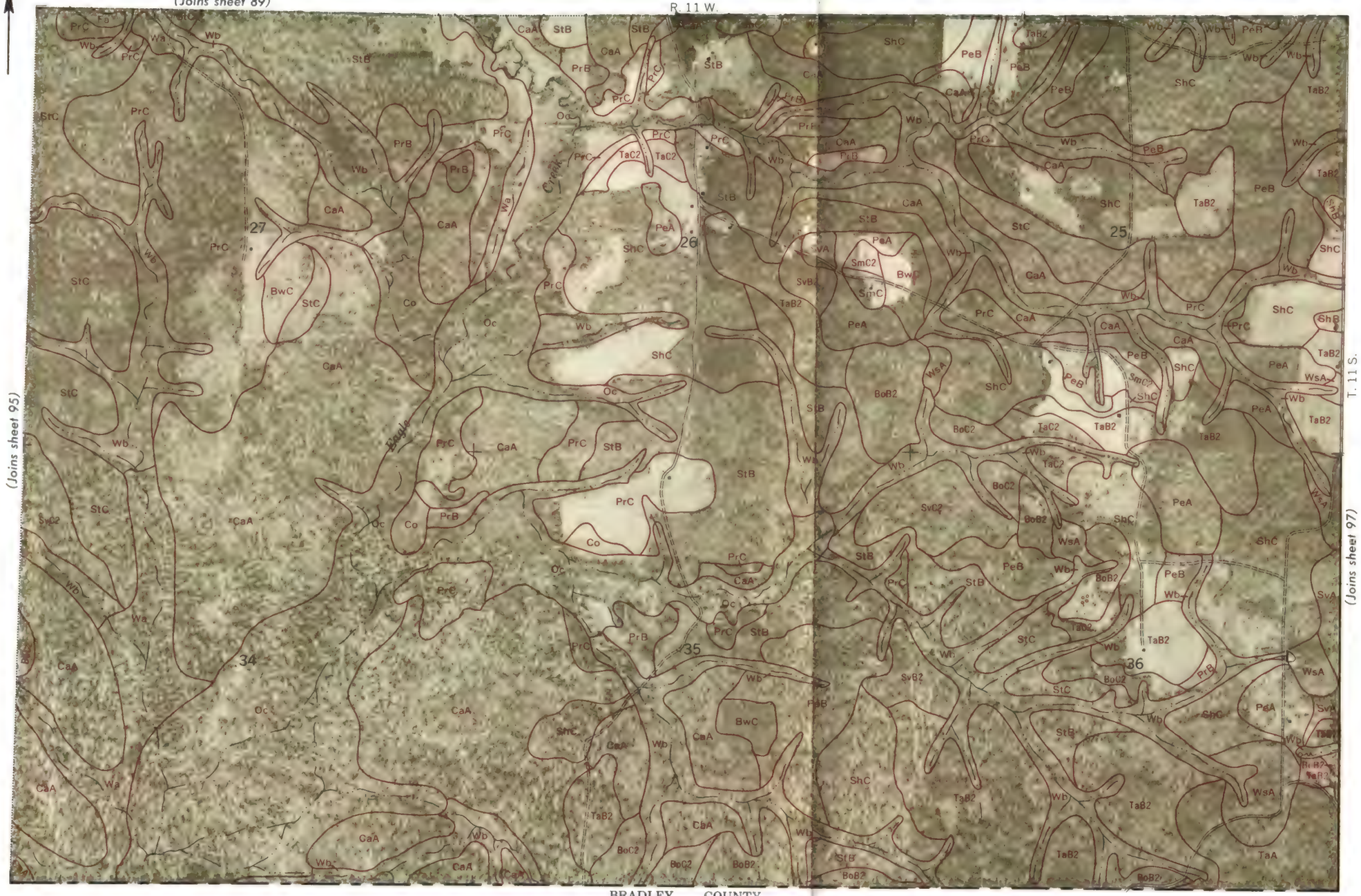
(Joins sheet 89)

R. 11 W.

T. 11 S.

(Joins sheet 95)

(Joins sheet 97)



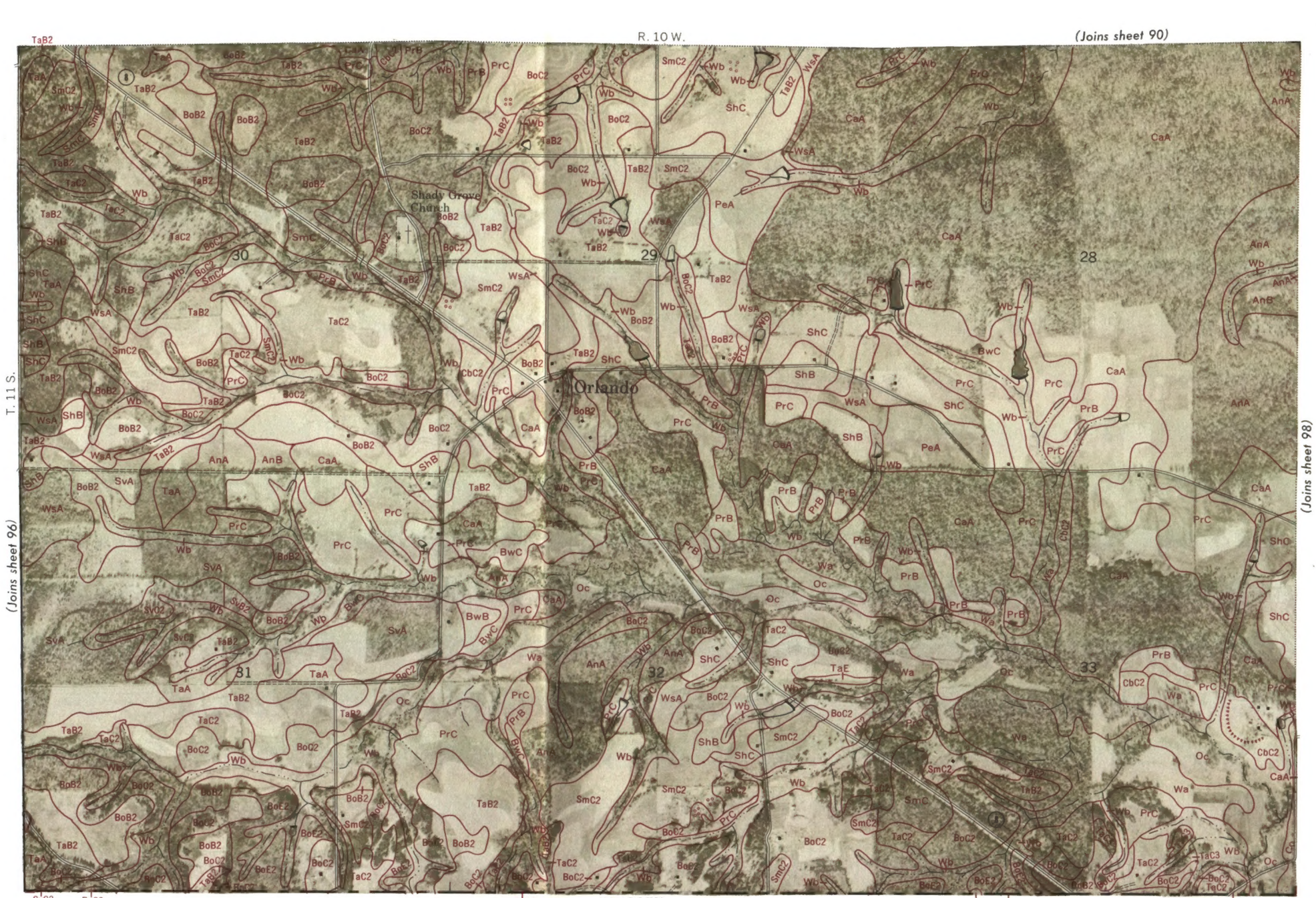
BRADLEY COUNTY

0 ½ Mile

Scale 1:15 840

0 3000 Feet

Range, township, and section corners shown on this map are indefinite.



0 ½ Mile Scale 1:15 840 0 3000 Feet

N

(Joins sheet 91)

R. 10 W.

(Joins sheet 97)

T. 11 S.

(Joins sheet 99)

BRADLEY COUNTY

0 ½ Mile Scale 1:15 840 0 3000 Feet

This map is one of a set compiled in 1966 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Arkansas Agricultural Experiment Station.

Range, township, and section corners shown on this map are indefinite.

0 ½ Mile Scale 1:15 840 0 3000 Feet

CLEVELAND COUNTY, ARKANSAS — SHEET NUMBER 100

100

N

(Joins sheet 93)

R. 9 W.

Crabapple Creek

Harmony Church

T. 11 S.

(Joins sheet 99)

DREW COUNTY

BRADLEY COUNTY

0 ½ Mile Scale 1:15 840 0 3000 Feet